DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

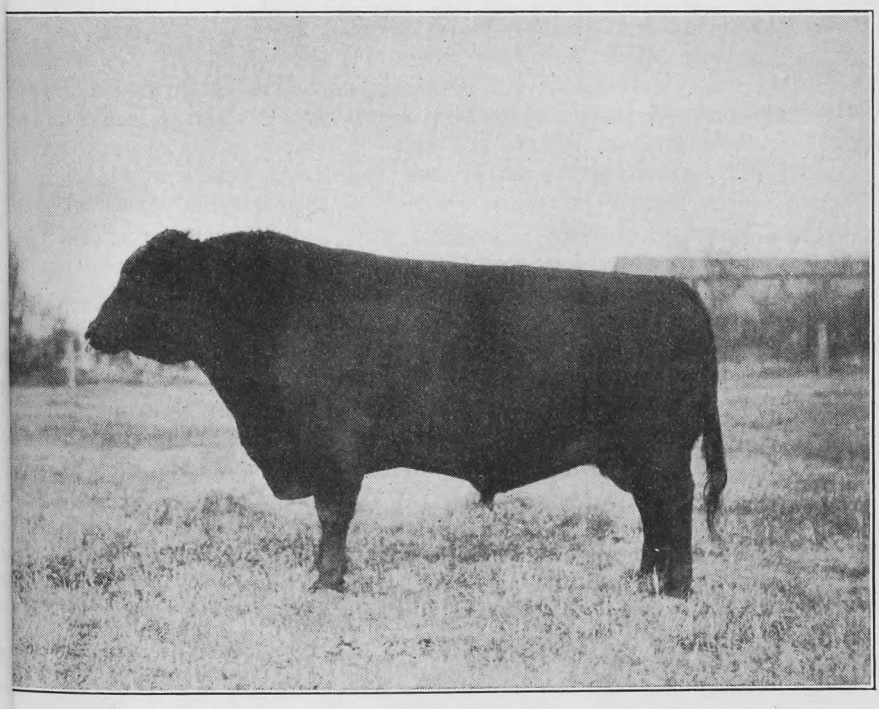
EXPERIMENTAL STATION

LACOMBE, ALBERTA

REPORT OF THE SUPERINTENDENT

F. H. REED, B.S.A.

FOR THE YEAR 1927



Earl Eric of Glencarnock—32463—Aberdeen-Angus junior herd sire.

ted by authority of the Hon. W. R. Motherwell, Minister of Agriculture, Ottawa, 1928

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DOMINION EXPERIMENTAL STATION, LACOMBE, ALBERTA

SEASONAL NOTES

The year 1927 was one of the coldest in the history of the Station, the average of the mean monthly temperatures being 3·23 degrees below the average of the last twenty years. January was 3·11 degrees and February was 4·07 degrees below the average. As a result of an excellent covering of snow on the ground, no winter killing occured among the winter crops. March was a normal month, but both April and May were cold, being 2·75 degrees and 3·54 degrees respectively below the average. The prevailing low temperatures during April and May made the spring seeding more backward than usual and tended to retard the development of spring-seeded crops until the warm weather and frequent showers of June and July hastened the development of the crop. The mean temperature for August was 1·57 degrees above the average. This relatively high temperature during August did not overcome the effect of the late spring. The ripening period of all cereals was delayed with an unusually large proportion of the medium and late maturing varieties being injured by early fall frosts. Excellent harvest and threshing weather prevailed during September and October, with the result that one of the heaviest crops ever produced in central Alberta was placed in the elevators in very fair condition. A recurrence of the low temperatures took place during November and December, these months being decidedly below the average in temperature. November was 14·89 degrees and December was 14·84 degrees below the twenty-year average in mean temperatures.

In addition to being decidedly below the average in mean temperatures, 1927 was also the wettest year on record, having a total precipitation of 25·17 inches, which is 7·14 inches above the average. Since this is the second consecutive year that the precipitation has been considerably above the previous highest recorded, many potholes and sloughs which were completely dry in 1923 and 1924 are now full of water. Also all the numerous small lakes are much above the normal water level. This, together with the fact that the soil is saturated to a considerable depth, will make a rank growth and late harvest almost certain. The use of early-maturing cereal varieties for 1928 would seem a wise precaution.

On July 19 a bad hail-storm did severe damage in the Lacombe district. Many farms just east of the Station suffered 100 per cent loss of grain crops, and at the Station a field of barley was a total loss. Fortunately the experimental plots were only slightly damaged. The gardens were in the path of the storm and all vegetables and flowers were cut back almost to the ground, but with a wet season made very rapid recovery. Strawberries, red and black currants, and gooseberries were badly damaged, but raspberries seemed but little injured and were a good crop. More hail damage occurred in central Alberta in 1927 than in any previous year in the history of the Station.

	Temperature (°F)						Precipitation				Sunshine		Wind
	Mean		Maximum		Minimum		Rain	Snow	Total Precipitation		1927	Average 20 years	
	1927	Average 20 years	Highest in 1927	Mean Maximum for 20 years	Lowest in 1927	Mean Minimum for 20 years			1927	Average 20 years			
							in.	in.	in.	in.	hours	hours	miles
January	6·19	9·30	43·0	43·9	−36·0	−35·4	.....	3·3	0·33	0·9	107·6	83·58	4,803
February	8·03	12·11	46·0	50·87	−39·0	−31·37	.....	12·7	1·27	0·64	114·2	123·5	4,657
March	22·20	21·23	53·0	55·74	−18·0	−19·08	.....	20·8	2·08	0·71	188·5	162·6	5,819
April	37·23	37·08	72·0	70·78	−0·0	8·01	.....	6·3	0·63	1·12	254·6	212·09	6·240
May	44·90	48·44	74·0	80·0	25·0	19·13	2·84	.....	2·84	1·97	201·7	234·8	6,880
June	56·37	55·18	80·0	84·41	35·0	29·52	3·42	.....	3·42	3·28	279·3	257·7	6,085
July	60·37	59·86	86·5	87·9	35·0	34·0	5·36	.....	5·36	2·92	299·2	289·8	4,594
August	59·55	57·98	85·0	87·11	37·0	31·86	1·76	.....	1·76	2·57	286·7	255·2	3,970
September	50·20	48·32	79·0	81·14	24·0	21·28	2·28	0·7	2·35	1·75	173·1	188·5	6,546
October	41·07	40·30	76·0	76·0	13·0	8·19	0·38	2·0	0·58	0·70	127·5	148·0	5,107
November	10·38	25·27	54·0	57·6	−19·0	−10·3	.....	21·3	2·13	0·76	81·5	107·9	5,066
December	−2·18	12·66	43·0	47·88	−46·0	−28·75	0·5	19·2	2·42	0·71	85·2	84·98	5,127
Totals	.....	.....	.....	.....	.....	.....	.....	.....	25·17	18·03	2,199·1	2,149·65	64,894

ANIMAL HUSBANDRY

HORSES

The horses kept at this Station numbered thirty-two head of all ages the close of the year and consisted of one imported Shire stallion, nine pure-bred Clydesdales including one colt foal, nine Shire-Clydesdale cross-bred including two colt foals, ten grade Clydesdale work horses, two pure-bred Hackneys and one driving mare.

FEEDING POTASSIUM IODIDE

The plan of feeding a teaspoonful of potassium iodide on the first fifteenth of each month to the mares in foal throughout the winter months been followed for several years. No joint-ill or navel trouble has been evident since this practice was started until this spring, when a pure-bred Clydesdale mare lost her filly foal from this disease. The occurrence of this case of joint-ill is rather difficult to explain as previous to this year all colts born at the station have been strong and vigorous since the feeding of potassium iodide was started in 1924. Prior to 1924 more or less trouble was encountered yearly with joint-ill and navel trouble. Further work for the control of joint-ill is being continued during the winter of 1927-28.

BEEF CATTLE

The herd of Aberdeen-Angus cattle totalled forty-six head on December 31, 1927, classified as follows:—

Classification	Males	Females
Senior herd sires	2	.....
Junior herd sires	1	.....
Females, three years or over	.....	14
Two-year olds	.....	5
Yearlings	2	4
Calves	7	8
Steers	3	.....
Totals	15	31

The natural increase in the Angus herd in 1927 was 18 head, 10 males and females.

During the year three Angus bulls were sold at the Spring Bull Sales, two t Calgary and one at Lacombe.

At the Calgary Sale, Lacombe King Earl —37337—, a son of Earl Eric f Glencarnock —32463—, was champion Angus bull of the show and sold for he high price of $240. The total of three head made an average price of 168.33 per head.

Angus steers were exhibited in the spring at the Calgary and Edmonton at Stock Shows. At Calgary four steers were shown by the Station, one steer eing placed first in the 1926 steer class. The three older steers were fourth, ixth and seventh in a large class which is a very fair showing when it is con-idered that they were in competition with the University of Alberta steers hat were winners at the Toronto Royal and the Chicago International in the all of 1926. At Edmonton the older steers were placed third, fifth and seventh. There was no class at Edmonton for 1926 steers. The 1926 steer weighing 690 ounds at fourteen months was sold at the Calgary Show for $150 or 21·74 ents a pound. The older steers weighing an average of 1,203 pounds at an verage age of 612 days were sold at the Edmonton Spring Show bringing $9.27 er hundredweight. The herd is entirely free from tuberculosis.

DAIRY CATTLE

The dairy cattle on hand December 31, 1927, total 45 head, all pure-bred Holsteins. The males include 2 herd sires and 8 calves, and the females include 3 mature cows, 4 four-year-olds, 4 two-year-olds, 8 yearlings and 6 calves, making a total of 10 bulls and 35 females. There has not been the usual increase in the herd because of the 16 cows which freshened only 5 gave heifer calves.

Nine young bulls were sold during the year to head dairy herds and as hey were all of good type and breeding they should be instrumental in raising he standard of the dairy herds in the districts to which they were sent. Numer-ous inquiries were received for heifers but none have been sold as they are being kept until at least the yield of their first lactation period has been ascer-tained.

Like the beef herd the dairy herd is free from tuberculosis having been fully accredited since November, 1924.

ADVANCED REGISTRATION OF DAIRY FEMALES AND DAIRY BULLS

This year the entire herd of females of milking age were submitted for Advanced Registration Inspection as well as all bulls eight months old and over. All of the eligible females duly passed official inspection by the associa-tion; one qualifying for registration in Class Gold Medal; three in Class Excel-lent; twelve in Class Good; and four in Class Fair. The Advanced Registration of both males and females by the Canadian Holstein-Friesian Association is a decided forward step that should in time have a far-reaching effect on the breed.

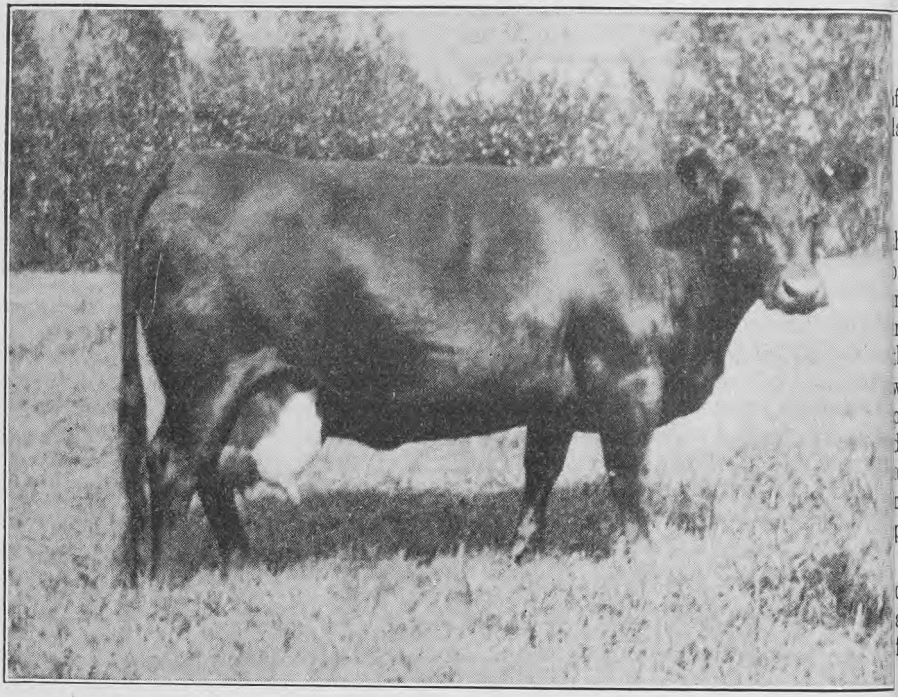
FEEDING METHODS

The meal mixture used at this Station for the dairy cows consists of 400 pounds rolled oats, 200 pounds bran and 200 pounds oil cake meal. The average rate of feeding the above grain mixture is one pound for every three and one-half pounds of milk produced. In addition to the meal mixture fed, each cow received one tablespoonful of the following mineral mixture per day: 100 pounds calcium carbonate, 100 pounds bone meal, 100 pounds salt, 25 pounds sulphur and 12 ounces potassium iodide. This mixture seems to have a bene-ficial influence on the cattle.

In the winter the roughage for the most part consists of oat, corn, sunflower silages, alfalfa hay and oat green feed. Occasionally roots upland hay are fed in addition to give a little more variety to the ration. is fed regularly and fresh water is available in bowls at all times. During summer the cows are pastured on brome grass and an annual pasture see with two bushels of oats and one bushel of fall rye per acre early in the spr If the pastures become dry and short, ensilage is fed and consumed readily

RECORD OF PERFORMANCE

Record of Performance work is featured with the dairy cattle at t Station. All normal cows and heifers are entered in the Record of Performa test when they freshen. Fourteen cows and heifers completed R.O.P. rec during the year. The 305-day record is the objective as there is a calv limit of 400 days, but where they do not hold to a service early enough to h them drop a calf within the time limit for the 305-day division they are car on for the 365-day record.



L. E. S. Mayapple Yorklawn 2nd—11105—produced 53 pounds milk, testing 4.8 per cent, in one day on special test.

The average production of the 15 cows finishing a lactation period with the calendar year 1927 was 13,904 pounds of milk and 605 pounds of butt for an average milking period of 349 days. Four of these records were ma by 2-year-old heifers. One mature cow and two 4-year-old cows complet 365-day R.O.P. records, averaging 14,773 pounds of milk and 627·5 pounds butter. Three mature cows and four 4-year-old cows completed 305 day R.O records, averaging 14,825 pounds of milk and 632·2 pounds of butter. Fo 2-year-old heifers completed 305-day R.O.P. records, averaging 10,339 pou of milk and 468·7 pounds of butter.

COWS QUALIFYING IN R.O.P. TESTS IN 1927 TOGETHER WITH AMOUNT OF PRODUCTION

Name and number of cow	Class	Number of days milking	Pounds of milk produced	Average per cent fat	Pounds of fat produced	Pounds 80 per cent butter
			lb.	%	lb.	lb.
E.S. May Echo Korndyke	Mature	365	16,974	3·72	632	790
E.S. Nina Mechthilde	4-yr-old	365	14,616	3·12	456	570
orndyke Evergreen L.E.S.	4-yr-old	365	12,730	3·29	419	524
E.S. May Echo Mechthilde	Mature	305	15,479	3·08	477	596
E.S. Evergreen Johanna	"	305	15,358	3·29	506	632
E.S. Princess Echo	"	305	12,233	3·69	452	565
E.S. Mechthilde Korndyke	4-yr-old	305	16,072	3·57	573	716
ina Gem Mechthilde L.E.S.	4-yr-old	305	15,509	3·31	513	641
losa Keyes L.E.S.	4-yr-old	305	15,061	3·59	541	676
E.S. Rosa Gretchen	4-yr-old	299	13,671	3·52	481	601
vergreen Korndyke L.E.S.	2-yr-old	305	12,410	3·90	474	592
ina Gem Korndyke L.E.S.	2-yr-old	305	9,851	3·76	370	462
orndyke Gretchen L.E.S.	2-yr-old	301	9,763	3·53	345	431
losa Korndyke L.E.S.	2-yr-old	305	9,331	3·35	313	391

This gives an average production for fourteen animals of 13,504 pounds of milk and 468 pounds fat equal to 585 pounds of 80 per cent butter in 317 days.

WEEKLY FEED COST OF MILK PRODUCTION

The accompanying table is a statement of the weekly milk production of the cows in the herd for 1927, together with the amount of feed consumed, cost of feed per hundred pounds of milk produced and profit over feed. It is interesting to note the low cost to produce 100 pounds milk and consequent increase in profit for the months of June, July, August, and September, when the cows were on pasture with the addition of meal only. A study of the table will reveal that it is to the advantage of the dairyman to provide plenty of good pasture for his milch cows throughout the summer months. It is true that during the summer months the prices for butterfat are as a rule lower than at any other time of the year but with milch cows on good pasture the increase in milk flow and the low cost of production will more than offset the difference in prices.

The profit column shows a comparison only between cost of feed and value of milk produced. The cost of the labour and the interest on the investment are not included. Similarly in cost per 100 pounds of milk no allowance is made for labour and investment.

In calculating the cost of feed the following values were used: Meal mixture, $1\frac{3}{4}$ cents a pound; corn and sunflower ensilage, $4 a ton; hay, $15 a ton; and oat greenfeed, $8 a ton. The meal mixture is charged at cost price and roughages at cost of production. Pasture is charged at $2 per month per cow.

The meal ration consisted of rolled oats, bran, and oilcake meal. The meal was mixed and fed in the following proportions: 400 pounds rolled oats, 200 pounds bran, and 200 pounds of oilcake meal. This meal was fed on the basis of 1 pound of meal to each $3\frac{1}{2}$ pounds of milk produced.

WEEKLY MILK PRODUCTION IN 1927

Week ending	Cows	Total pounds of milk	Meal	Ensilage	Hay	Oat green-feed	Pasture	Total cost of feed	Cost of feed to produce 100 lbs. milk	Total value of milk at $2.00 a cwt.
	No.	lb.	lb.	lo.	lb.	lb.	days	$ cts.	$ cts.	$ cts.
Jan. 8	9	1,960·7	582·6	2,610	935	300	.....	23 62	1 20	39 21
" 15	8	1,834·2	533·0	2,440	855	280	.....	21 74	1 18	36 68
" 22	8	1,791·4	515·6	2,470	875	270	.....	21 60	1 21	35 83
" 29	9	2,339·8	675·0	2,560	920	320	.....	25 11	1 07	46 80
Feb. 5	9	2,366·7	702·5	2,520	930	315	.....	25 56	1 08	47 33
" 12	9	2,236·6	667·0	2,580	935	320	.....	25 72	1 15	44 73
" 19	9	2,229·8	645·0	2,630	925	315	.....	24 75	1 11	44 60
" 26	10	2,377·5	712·0	2,980	1,025	335	.....	27 45	1 15	47 55
Mch. 5	11	2,923·3	845·6	3,450	1,120	365	.....	31 56	1 08	58 59
" 12	10	3,265·2	946·2	3,080	1,020	340	.....	31 73	0 97	65 30
" 19	10	3,104·3	897·5	3,140	1,030	345	.....	31 09	1 00	62 09
" 26	11	3,497·3	1,012·0	3,500	1,125	370	.....	34 63	0 99	69 95
Apr. 2	11	3,521·0	1,021·3	3,530	1,130	355	.....	34 82	0 99	70 42
" 9	11	3,423·2	992·4	3,520	1,135	350	.....	34 32	1 00	68 46
" 16	11	3,439·6	998·7	3,490	1,120	365	.....	34 32	1 00	68 79
" 23	11	3,661·5	1,059·0	3,510	1,130	355	.....	35 47	0 97	73 23
" 30	12	4,151·3	1,202·3	3,840	1,260	415	.....	39 83	0 96	83 03
May 7	13	4,387·4	1,262·8	4,210	1,360	420	.....	42 43	0 97	87 75
" 14	13	4,583·2	1,320·0	4,150	1,365	415	.....	43 29	0 94	91 66
" 21	13	4,550·5	1,308·5	4,180	1,370	420	.....	43 11	0 95	91 01
" 28	13	4,553·9	1,314·9	4,200	1,375	410	.....	43 36	0 95	91 08
June 4	13	4,468·8	1,287·0	.....	.....	.....	91	28 59	0 64	89 38
" 11	13	4,588·0	1,323·2	.....	.....	.....	91	29 23	0 64	91 76
" 18	13	4,661·8	1,344·0	.....	.....	.....	91	29 59	0 63	93 24
" 25	13	4,464·9	1,290·5	.....	.....	.....	91	28 65	0 64	89 30
July 2	13	4,381·2	1·267·0	.....	.....	.....	91	28 24	0 64	87 62
" 9	13	4,083·2	1,170·7	.....	.....	.....	91	26 56	0 65	81 66
" 16	13	4,016·6	1,155·4	.....	.....	.....	91	26 29	0 65	80 33
" 23	13	3,920·7	1,132·0	.....	.....	.....	91	25 88	0 66	78 41
" 30	13	3,755·7	1,087·6	.....	.....	.....	91	25 10	0 67	75 11
Aug. 6	13	3,765·0	1,092·3	.....	.....	.....	91	25 18	0 67	75 30
" 13	13	3,587·9	1,033·7	.....	.....	.....	91	24 16	0 67	71 76
" 20	13	3,666·4	1,059·5	.....	.....	.....	91	24 61	0 67	73 33
" 27	13	3,500·2	1,011·4	.....	.....	.....	91	23 77	0 68	70 00
Sept. 3	13	3,184·3	915·1	.....	.....	.....	91	22 08	0 69	63 69
" 10	13	3,239·7	930·0	.....	.....	.....	91	22 52	0 69	64 79
" 17	13	3,111·7	895·4	.....	.....	.....	91	21 74	0 70	62 23
" 24	13	2,974·6	855·1	.....	.....	.....	91	21 03	0 71	59 49
Oct. 1	11	2,718·7	786·0	.....	.....	.....	77	18 88	0 69	54 37
" 8	12	2,849·5	821·3	1,800	1,000	.....	36	27 87	0 98	56 99
" 15	12	2,847·5	818·8	3,780	1,450	.....	.....	32 76	1 15	56 95
" 22	13	2,985·0	869·3	4,120	1,800	.....	.....	36 95	1 24	59 70
" 29	13	3,071·1	886·0	4,150	1,790	.....	.....	37 22	1 21	61 42
Nov. 5	13	2,987·2	867·2	4,080	1,820	.....	.....	36 99	1 24	59 74
" 12	13	2,925·0	849·0	4,100	1,810	.....	.....	36 63	1 25	58 50
" 19	12	2,816·9	817·8	3,840	1,690	.....	.....	34 66	1 23	56 34
" 26	12	2,742·0	798·6	3,860	1,670	.....	.....	34 21	1 25	54 84
Dec. 3	11	2,680·7	780·0	3,580	1,540	.....	.....	32 36	1 21	53 61
" 10	11	2,622·0	755·0	3,600	1,550	.....	.....	32 03	1 22	52 44
" 17	11	2,578·7	745·0	3,680	1,530	.....	.....	31 87	1 23	51 57
" 24	11	2,490·1	721·6	3,640	1,560	.....	.....	31 61	1 27	49 80
" 31	11	2,395·5	701·2	3,690	1,540	.....	.....	31 20	1 30	47 91

MILK PRODUCTION OF PURE-BRED COWS

The accompanying table gives a statement of the milk and fat produc and feed-consumption records for all cows and heifers which have finishe normal lactation period during the year 1927. In addition to those repo there are several cows that have not completed a period during the year one heifer which is now milking in her first period. The feed charges give this table are for the feed eaten during the actual period of milking, no all ance being made for the dry period previous to calving.

The profit column shows a comparison only between cost of feed and va of milk produced. The labour cost of caring for the cattle, the manufactur butter, the interest on the investment, depreciation, etc., are not included no the value of calf at birth.

Butter is computed at 40 cents per pound and skim-milk at 20 cents 100 pounds.

In estimating the cost of feeds the following values were used:—

Meal (oats, bran and oil cake)	$35 00 per ton.
Corn and sunflower ensilage	4 00 per ton.
Hay	15 00 per ton.
Oat green feed	8 00 per ton.
Pasture per month per cow	2 00

The meal mixture is charged at cost price and roughage at cost of producti

INDIVIDUAL MILK RECORDS COMPLETED DURING THE YEAR 1927

Name of Cow	No. of lactation period	No. of days in milk	Total pounds of milk for period	Daily average yield of milk	Average per cent fat in milk	Pounds fat for period	Pounds butter for period	Value of butter at 40 cents a pound	Value of skim-milk at 20 cents per cwt.	Total value of product	Amount of meal eaten	Amount of ensilage eaten	Amount of hay eaten	Amount of green-feed eaten	Months on pasture at $2 a month	Total cost of feed for period	Cost of feed to produce 100 pounds milk	Cost to produce 1 pound butter, skim-milk neglected	Profit on 1 pound butter skim-milk neglected	Profit on cow for period labour and calf neglected
		days	lb.	lb.	%	lb.	lb.	$ cts.	$ cts.	$ cts.	lb.	lb.	lb.	lb.	mos.	$ cts.	$ cts.	cts.	cts.	$ cts.
Evergreen Korndyke L.E.S	1	533	18,570	34·8	3·90	724	905·0	362 00	35 69	397 69	5,413	16,960	4,526	1,475	8·25	184 99	0 99	20·4	19·6	212 70
L.E.S. May Echo Korndyke	3	512	19,866	38·8	3·57	709	886·2	354 48	38 31	392 79	5,780	19,140	5,136	1,570	6·25	196 73	0 99	22·2	17·8	196 06
L.E.S. Mechthilde Korndyke	3	314	16,182	51·5	3·57	578	722·5	289 00	31 21	320 21	4,708	11,100	2,960	925	4·25	137 60	0 85	19·0	21·0	182 61
Rosa Keyes L.E.S	2	308	15,099	49·0	3·59	542	677·5	271 00	29 11	300 11	4,406	10,740	2,864	895	4·25	132 14	0 87	19·5	20·5	167 97
Nina Gem Mechthilde L.E.S	3	322	15,914	52·0	3·38	538	672·5	269 00	30 75	299 75	4,618	13,740	3,664	1,145	3·0	146 35	0 92	21·7	18·3	153 40
L.E.S. Evergreen Johanna	6	305	15,358	50·3	3·29	506	632·5	253 00	29 70	282 70	4,453	10,565	2,894	912	4·25	132 91	0 86	21·0	19·0	149 79
L.E.S. Rosa Gretchen	2	299	13,671	45·7	3·52	481	601·2	240 48	26 38	266 86	3,990	10,440	2,784	870	4·25	123 56	0 90	20·5	19·5	143 30
L.E.S. May Echo Mechthilde	5	305	15,479	50·7	3·08	477	596·2	238 48	30 00	268 48	4,511	10,672	2,866	921	4·25	133 95	0 86	22·5	17·5	134 53
L.E.S. Princess Echo	2	322	12,327	38·3	3·69	455	568·7	227 48	23 74	251 22	3,605	11,653	3,104	970	4·25	122 06	0 99	21·5	18·5	129 16
L.E.S. Nina Mechthilde	2	400	14,958	37·4	3·12	467	583·7	233 48	28 98	262 46	4,343	16,565	4,416	1,375	4·25	156 25	1 44	26·8	13·2	106 21
Korndyke Evergreen L.E.S	2	368	12,738	34·6	3·29	419	523·7	209 48	24 64	234 12	3,722	14,400	3,840	1,200	4·25	136 03	1 68	25·9	14·1	98 09
Nina Gem Korndyke L.E.S	1	305	9,851	32·3	3·76	370	462·5	185 00	18 96	203 96	2,924	10,670	2,900	922	4·25	106 45	1 08	23·0	17·0	97 51
Korndyke Gretchen L.E.S	1	301	9,799	32·5	3·53	346	432·5	173 00	18 91	191 91	2,877	10,560	2,836	902	4·25	104 85	1 07	24·2	15·8	87 06
May Korndyke Lee L.E.S	2	322	9,374	29·1	3·60	337	421·2	168 48	18 07	186 55	2,770	11,700	3,095	967	4·25	107 46	1 15	25·5	14·5	79 09
Rosa Korndyke L.E.S	1	315	9,375	29·8	3·35	314	392·5	157 00	18 12	175 12	2,792	11,250	3,010	955	4·25	106 25	1 13	27·1	12·9	68 87
Total for herd (15 cows)	.....	5,231	208,561	.....	.....	7,263	9,078·4	3,631 36	402 57	4,033 93	60,912	190,155	50,895	16,004	68·50	2,027 58	.....	.....	.....	2,006 35
Average for herd (15 cows)	.....	348·7	13,904·06	39·9	3·48	484·2	605·22	242 09	26 84	268 93	4,060·8	12,677	3,393	1,066·93	4·57	135 17	97·2	22·3	17·7	133 76

SWINE

The breeding stock at the Station at the end of the year was made up 21 Yorkshire sows and 3 Yorkshire boars; 14 Tamworth sows and 3 Tamwor boars; 10 Berkshire sows and 1 Berkshire boar and 2 cross-bred sows, maki a total of 47 head of sows and 7 boars.

The Yorkshire herd was strengthened this fall by the addition of the bo Dalmeny A.R. —88840— obtained from the Central Experimental Farm, Ottaw Ont. This boar was imported by the Central Farm in 1923 from the herd the Earl of Rosebery, Dalmeny, Scotland, and was sired by one of the greate breeding boars ever used in Scotland.

A young boar purchased from the herd of D. Douglas & Sons, Mitche Ont., was added to the Tamworth herd this year. This boar, Maplehurst Rufu —20976—, born March 20, 1927, was Grand Champion at the Canadian Nation Exhibition at Toronto during the summer, and Reserve Grand Champion the Royal Winter Fair in November, only being defeated for the Grand Cha pionship by his own sire.

The Berkshire herd is now headed by the boar Summerland Hyl —69298—. He was bred at the Dominion Experimental Station, Summerlan B.C., and represents an exceptionally long type of Berkshire He possesses th quality and bacon type now desired in Berkshires, combined with true Berk shire character.

Although there was a big decrease in pork prices in the latter part of th year the demand for breeding stock continued brisk and widespread. Farmer have apparently learned that these slumps in hog prices are only temporar and the demand for bred gilts and young boars has seldom been more gener and at good prices. Yorkshires are still quite the most in demand, but man more inquiries for Berkshires were received in the fall of 1927 than during th whole year 1926. The demand for Tamworths is about midway between York shires and Berkshires.

COMPARISON OF THE PROLIFICACY OF OLD SOWS AND GILTS OF THE YORKSHIRE BREED, AS SHOWN BY TH 1927 LITTERS

—		"Old Sows," second litter or more	Gilts first litter
Number of litters farrowed in 1927	No.	19	13
Total number of pigs farrowed	No.	212	114
Number of pigs per litter (average)	No.	11·16	8·77
Number pigs dead at birth	No.	25	8
Number of pigs dead at birth per litter (average)	No.	1·31	0·61
Number of pigs died before weaning per litter (average)	No.	2·63	2·38
Number pigs weaned per litter (average)	No.	7·21	5·77
Percentage of pigs raised of those farrowed alive	%	73·26	70·73

A few of the choicest gilts are added to the Station breeding herd ever year. As it has been found that sows will raise on an average about 2 pig more per litter or 4 pigs a year, more than gilts, the best breeding sows ar retained in the herd as long as they prove satisfactory. This is frequentl until they are four or five years old.

FARROWING STATEMENT FOR 1927

	Spring litters			Fall litters			Total Spring and fall litters			Herd Total
	Yorks	Tams	Berks	Yorks	Tams	Berks	Yorks	Tams	Berks	
Number of litters farrowed in 1927	20	7	5	12	6	3	32	13	8	53
Total number of pigs farrowed....	203	54	47	123	46	33	326	100	80	506
Number of pigs per litter (average)	10·1	7·7	9·4	10·2	7·7	11·0	10·2	7·7	10·0	9·5
Number of pigs dead at birth.....	25	9	6	8	1	3	33	10	9	52
Number of pigs dead at birth per litter (average).....	1·25	1·28	1·20	0·66	0·16	1·0	1·03	0·77	1·12	0·98
Number pigs died before weaning per litter (average).....	3·90	2·6	3·0	3·0	2·0	2·0	3·56	2·31	2·62	3·11
Number pigs weaned per litter (average).....	6·25	5·14	6·40	7·25	5·67	9·0	6·60	5·39	7·37	6·43
Percentage of pigs, farrowed alive, raised.....	70·22	80·00	78·05	75·65	75·55	90·00	72·01	77·77	83·10	75·11

The above statement shows that 53 litters were raised during the year of which 32 were spring and 21 were fall litters. The litters averaged 9·5 pigs per litter farrowed and 6·4 per litter raised.

Litters farrowed after July 1 are called fall litters, as they must be grown and finished mainly under fall and winter conditions.

Cheap but comfortable winter shelter for brood sows.

The percentage of spring farrowed pigs raised was only 63·5 as against 73·3 per cent of the fall farrowed. Hence the number of pigs raised per litter was considerably higher in the fall than in the spring litters. For this reason and because the price received for the fall farrowed litters when marketed is almost always higher than the price for the spring farrowed litters it has been found that the fall farrowed litters show considerably higher profits. For good results fall litters should all be farrowed not later than September 15 so as to have the pigs well developed and able to stand cold weather by November.

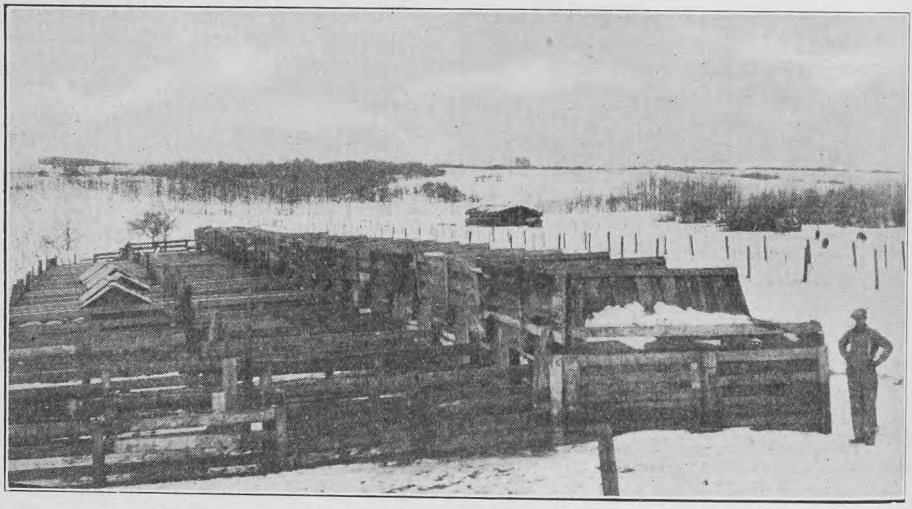
PROLIFICACY OF DIFFERENT BREEDS

The 1927 farrowing statement shows the Yorkshires to lead in prolificacy followed by the Berkshires and Tamworths in order. The average Yorkshire litter farrowed in 1927 was 10·2 as compared with 10·0 for Berkshires and 7·7 for Tamworths. It should be remembered that there was a greater number of gilts with their first litter among the Yorkshires which lowered the breed

average because the gilts farrowed smaller litters than the older sows. In the average number of pigs raised per sow, Berkshires lead with an average of 7·37 per sow; the Yorkshires next with an average of 6·60 and the Tamworths last with 6·43 per sow. The poorer showing of the Yorkshires as compared with the Berkshires in the average number of pigs raised per sow may be accounted for when the fact is taken into consideration that there were four times more Yorkshire litters farrowed than Berkshires and many of these litters were farrowed in January and February, at which time the mortality was heavy owing to the very cold weather conditions. Another point in this connection is that of 32 Yorkshire litters, 13 were from gilts, while the 8 Berkshire litters were all from mature sows. The 19 mature Yorkshire sows farrowed an average of 11·2 pigs per litter and raised an average of 7·2 as compared with an average of 10·0 pigs per litter farrowed and 7·37 raised for the Berkshires. All the Tamworth litters with one exception were from mature sows.

THREE-YEAR SUMMARY OF FARROWING STATEMENT COMPARING PROLIFICACY OF BREEDS

Breeds	1925			1926			1927			Three-year Average		
	Number of sows	Pigs farrowed	Pigs weaned	Number of sows	Pigs farrowed	Pigs weaned	Number of sows	Pigs farrowed	Pigs weaned	Number of sows	Pigs farrowed	Pigs weaned
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Yorkshire.....	29	10·5	6·0	24	10·5	7·23	32	10·2	6·60	28·3	10·3	6·61
Berkshire.....	13	8·7	5·5	7	8·8	6·75	8	10·0	7·37	9·3	9·17	6·54
Tamworth.....	21	6·9	4·6	10	8·7	6·37	13	7·7	5·39	14·7	7·77	5·45



Inexpensive but very satisfactory equipment for feeding fall litters.

The above table is a summary of three years of breeding work comparing the prolificacy of the Yorkshire, Berkshire and Tamworth breeds of swine. In size of litters farrowed and in average number of pigs weaned per sow the Yorkshire ranks first, the Berkshire second and the Tamworth third. This is more striking when it is considered that there were over three times more Yorkshire litters farrowed than Berkshire and almost twice more than the Tamworth. As Tamworths have been raised at the Station only since 1925, only a three-year average is possible.

SOFT PORK INVESTIGATION

Object of Experiment.—To determine the effect of light and heavy feeding upon the firmness of pork.

Plan of Experiment.—Twenty pure-bred Tamworth pigs were divided into two lots as even as possible with respect to size, age, type, breeding and general thrift. The average age of the pigs at the beginning of the experiment was fifty-two days and previous to the beginning of the test the feeding and management of the pigs was practically the same. Each lot was confined to a dry lot approximately one-eighth of an acre in extent and provided with "A"-shaped portable cabins for protection against the sun and weather. Six weeks previous to the close of the experiment the pigs were placed in the main piggery. Both lots received the same basic ration throughout the test which included 5 per cent tankage and 7 per cent bran for the first forty-six days, and 7 per cent tankage for the next sixty-two days. No protein supplement was fed during the remaining sixty-two days of the experiment. The meal was fed dry and water was supplied in a separate trough twice daily. The mineral mixture fed was: Soft coal, 165 pounds, bone meal, 20 pounds, and salt, 15 pounds.

SOFT PORK FEEDS—PROPORTION AND QUANTITY FED

Lot	No. of pigs	Breed	No. of days fed	Meal ration fed	Quantity of meal fed in proportion to live weight	Other feeds
1	10	Tamworth.....	170 July 15 to Dec. 31	First 46 days Oat chop, 3 parts barley chop, 1 part; shorts, 1 part; bran, 7 per cent.	Full feed in trough during entire period	5 per cent tankage
				Second 62 days Oat chop, 2 parts; barley chop, 1 part; shorts, 1 part		7 per cent tankage
				Last 62 days of test Barley chop, 3 parts; oat chop, 1 part.		No supplement.
2	10	Tamworth.....	170 July 15 to Dec. 31	Same as lot 1.....	3 per cent to 109th day then full ration	Same as Lot 1.

Rates of Feeding.—The quantity of meal fed was a full ration in a trough twice a day to lot 1 and 3 per cent of the live weight per day to lot 2. Two months previous to the close of the experiment the pigs in lot 2 were given all they would consume.

At the end of the experiment the hogs were shipped to a packing-plant in Edmonton and graded on foot by a Dominion Government grader and on the rail by the superintendent of the plant.

Throughout the process of slaughtering the identity of each hog was maintained and when the carcasses were thoroughly cooled the superintendent of the plant examined each carcass on the rail for softness. He pronounced all carcasses to be firm varying only in degree of firmness. The fact that the refractive index determination of rendered fat showed that there was one soft carcass in each lot, indicated that some factor other than the quantity of feed fed in this particular test influenced the firmness of the pork.

RATES OF FEEDING HOGS IN DRY LOT

Method of feeding		Lot 1 Heavy hand feeding	Lot 2 3 per cent ration
Number of hogs in experiment		10	10
Gross weight July 14, 1926	lb.	349	350
Average weight July 14, 1926	"	34·9	35·0
Gross weight December 31, 1926	"	2,095	2,061
Average weight December 31, 1926	"	209·5	206·1
Total gain per lot during test (170 days)	"	1,746	1,711
Average gain per animal for period	"	174·6	171·1
Average daily gain per animal	"	1·03	1·01
Amount of meal eaten by group	"	7,479	6,993
Amount of tankage consumed by group	"	354	332
Cost of protein supplement per lot	"	8·85	8·30
Amount of meal eaten per pound gain	"	4·28	4·09
Amount of tankage per pound gain	"	0·203	0·194
Total cost of feed	$	86 38	80 71
Cost of feed per head	"	8 64	8 07
Cost of feed per head per day	cts.	5·08	4·75
Cost of feed to produce one pound gain	"	4·95	4·72
Returns per head at 11 cents per pound less cost of feed	$	14 40	14 60
Average dressing percentage	%	70·9	72·9
Number of hogs sold out of lot	No.	9	9
Number of hogs grading "select" on foot	"	7	7
Number grading "select" on foot that were later graded "select" in carcass	"	6	6
Number of carcasses grading "select"	"	7	6
Grading on rail as to firmness—			
Number graded "very firm"	"	6	5
Number grade l "firm"	"	1	2
Number graded "barely firm"	"	2	2
Number graded "slightly soft"	"		
Number of soft carcasses following refractive index determination of rendered fat	"	1	1

Cost of gain is based on—

Oat chop, at 34 cents per bushel
Barley chop, at 48 cents per bushel.
Shorts, at $27 a ton
Bran, at $25 a ton.
Tankage, at $50 a ton.

DEDUCTIONS.—In this experiment the grading on the market did not favour one system of feeding more than another. All pigs which were within the required weights graded "selects."

The pigs on heavy hand feeding produced greater gains but made these gains with a greater feed consumption than the limited fed pigs, resulting in a slightly lower net profit.

There was very little difference between the lots with respect to daily gains made but the meal consumption for the heavily fed lot was 4·28 pounds per pound of gain and for the lightly fed lot 4·09 or ·19 of a pound less while the tankage consumption was 0·203 and 0·194 pounds respectively.

Compared in the final analysis on costs of feeds to produce a pound of gain the heavily-fed lot cost 4·95 cents, while the lightly fed lot cost 4·72 or ·23 cents less.

It was found that a ration limited to 3 per cent of the body weight was not enough to satisfy the appetites of rapidly growing hogs. The pigs seemed to be always hungry and had a gaunt appearance. One of the seven 3 per cent ration hogs which was graded "select" on foot was found to be "unfinished" on the rail.

SELF-FEEDING VS. TROUGH-FEEDING

Object of Experiment.—To determine the relative efficiency of the methods "Hand-fed" and "Self-fed" in the production of select hogs in dry lot.

Plan of Experiment.—In this experiment sixteen pure-bred Yorkshire pigs were used. They were divided into two groups of eight pigs each. In making the allotment four sows carrying uniform pigs were selected to provide the experimental pigs. Two pigs from each sow were placed in each of the two lots, thus providing two uniform groups of pigs. This method of allotment made provision for reasonable uniformity within the groups as to breeding, age, initial weight and potentiality as to ultimate type. The pigs were farrowed in February and March and the average age at the beginning of the experiment was 2½ months. Both lots were confined to dry lots approximately one-eighth of an acre in extent and were provided with A-shaped portable cabins for shade and shelter. All grain was ground and fed dry, and in the case of the trough-fed lot the grain was given three times a day until the pigs had reached an average of eight pounds each, after which twice-a-day feeding was followed. Each group had access to a constant supply of fresh water and to a mineral mixture of slacked coal, bone meal and salt. Both lots received the same basic ration of oat and barley chop throughout the test, which included 10 per cent tankage, until the pigs reached an average weight of 125 pounds, after which 5 per cent was the amount fed.

Rates of Feeding.—Lot 1 was self-fed and the quantity of feed fed to lot 2 was 4 per cent, based on the live weight of the hogs taken at intervals of seven days.

SELF-FEEDING VS. TROUGH-FEEDING—PROPORTIONS AND QUANTITY FED

Lot	Number of Pigs	Breed	Number of days fed	Meal ration fed	Quantity of meal fed in proportion to live weight	Other feeds
1	8	Yorkshire..	141	First 35 days— Oat chop 3 parts, Barley chop 1 part. Second 49 days— Oat chop 2 parts, Barley chop 1 part. Third 25 days— Oat chop 1 part, Barley chop 1 part. Last 32 days of test— Oat chop 1 part, Barley chop 2 parts.	Full feed, self-feeder during entire period.	Tankage 10 per cent. Tankage 10 per cent. Tankage 5 per cent. Tankage 5 per cent.
2	8	Yorkshire..	141	Same as Lot 1.....	4 per cent of live weight during entire period.	Same as Lot 1

When the pigs were ready for market they were shipped to a packing-plant in Edmonton, where they were graded on foot by a Dominion Government grader and on the rail by the superintendent of the plant. There were two in the self-feeder lot which were not up to the market weight when the other pigs were ready to ship and hence no official grading is given for these pigs.

The identity of each hog was maintained through the process of slaughtering and when the carcasses were thoroughly cooled the superintendent of the plant examined each carcass on the rail for softness. All carcasses from this test were pronounced "firm" or "barely firm", indicating that with the feeds used neither the self-feeding nor trough-feeding method of feeding influenced the degree of firmness of the pork to an appreciable extent.

Method of feeding		Lot 1 Self-feeder	Lot 2 4 per cent ration
Number of hogs in experiment		8	8
Gross weight, May 9, 1927	lb.	443	452
Average weight, May 9, 1927	"	55·4	56·5
Gross weight, Sept. 27, 1927	"	1,510	1,522
Average weight, Sept. 27, 1927	"	188·7	190·2
Total gain per lot during test (141 days)	"	1,067	1,070
Average gain per animal for period	"	133·4	133·7
Average daily gain per animal	"	0·946	0·94
Amount of meal eaten by group	"	6,141	5,016
Amount of tankage consumed by group	"	475	390
Cost of protein supplement per lot	$	11 87	9 73
Amount of meal eaten per pound gain	lb.	5·75	4·69
Amount of tankage per pound gain	"	0·445	0·36
Total cost of feed, including tankage	$	101 83	83 20
Cost of feed per head	$	12 73	10 40
Cost of feed per head per day	cts.	9·03	7·37
Cost of feed to produce one pound gain	"	9·54	7·78
Profit per head at 11·75 cents per pound, less cost of feed	$	9 45	11 95
Average dressing percentage	lb.	75·43	75·44
Number of hogs sold out of lot		6	8
Number of hogs grading "select" on foot		0	5
Number graded "select" on foot that were later graded "select" in carcass		0	5
Number of carcasses grading "select"		0	7
Average length of side	ins.	30·3	31·4
Grading on rail as to firmness—			
Number graded "very firm"		1	3
Number graded "firm"		3	3
Number graded "barely firm"		2	2
Number graded "slightly soft"		0	0
Number of soft carcasses following refractive index determination of rendered fat		0	0
Total oat chop consumed	lb.	3,331	2,716
Total barley chop consumed	"	2,810	2,300

Cost of gain is based on
Oat chop at 50 cents a bushel.
Barley chop at 70 cents a bushel.
Tankage at $50 a ton.

The chemical analyses of No. 4 feed oats and No. 4 C.W. barley are as follows:—

—	Moisture	Protein	Fat	Carbo-hydrates	Fibre	Ash
Oats	12·22	11·72	4·35	61·43	7·66	2·62
Barley	13·59	10·90	1·40	67·98	3·64	2·49

DEDUCTIONS—*Methods of Feeding.*—In comparing the two lots we find that there is very little difference with respect to daily gains made but in meal consumption the pigs on the self-feeder required 1·06 pounds more meal and 0·081 pound more tankage for one pound of gain.

Compared on the basis of cost of feed required to produce one pound of gain the self-fed lots show a cost of 9·54 cents while the lot fed the 4 per cent ration shows a cost of 7·78 cents or 1·76 cents less cost per pound of gain in live weight. Where water has to be carried to pigs daily this difference of $1.76 per 100 pounds cost of gain would much more than pay for the extra work of trough feeding the grain. Added to this difference in cost would also be the increased gain of about $1 per hog for the extra number of " selects ".

In this experiment while the feed requirement for 100 pounds of gain was fairly satisfactory the daily gains were low and comparatively expensive. The ration used consisting of oats, barley, and tankage is low in protein as well as lacking in variety, and this fact no doubt influenced the rate and economy of gain to a considerable extent. Had these pigs been on pasture and either skim-milk or shorts added to the ration, larger gains would have been made at lower costs. While barley and oats are excellent foundation feeds for hogs, the addition of other feeds is necessary for good results.

Type.—In this experiment comparing the two methods of feeding, five hogs graded select on foot and seven on the rail out of the hand-fed group. No selects, either on the hoof or on the rail, were graded out of the self-fed group. The hand-fed pigs were longer on the average by 1·1 inches than the self-fed pigs. The self-fed pigs were also inclined to show more heaviness of middle than those hand-fed.

The results of this single test would seem to indicate that the method of feeding or quantity of feed fed had a decided influence on the type of pig at market weight.

INFLUENCE OF FEEDS AND METHODS OF FEEDING ON TYPE

Object of Experiment.—1. To determine the influence of self-feeding, heavy hand-feeding and medium hand-feeding on bacon type.

2. To compare self-feeding and heavy and medium hand-feeding as to their influence with regard to type of hog, and in addition as to rate and economy of gains under both pasture and dry lot conditions.

3. To determine the effect which the eliminating of tankage will have on these points.

4. To determine whether the use of pasture is conducive to the production of the bacon type of hog as compared with dry lot feeding.

Experimental Methods.—Seventy-two pigs were used in this experiment, including 27 pure-bred Yorkshires, 12 pure-bred Tamworths, 8 pure-bred Berkshires, and 22 crosses from these three breeds. They were divided into nine lots containing eight pigs each. As even a distribution as possible was made with respect to size, age, type, breeding, and general thrift. The average weight of the pigs was approximately 70 pounds when the test started on July 11. Previous to the beginning of the test the feeding and management of all pigs was practically the same.

The various groups lined up as follows:—

Lot 1—Grain and tankage—self-feeder—rape pasture.
Lot 2—Grain and tankage—heavy hand-feeding—rape pasture.
Lot 3—Grain and tankage—medium hand-feeding—rape pasture.
Lot 4—Grain—no protein supplement—self-feeder—rape pasture.
Lot 5—Grain—no protein supplement—heavy hand-feeding—rape pasture.
Lot 6—Grain—no protein supplement—medium hand-feeding—rape pasture.
Lot 7—Grain and tankage—self-feeder—dry lot.
Lot 8—Grain and tankage—heavy hand-feeding—dry lot.
Lot 9—Grain and tankage—medium hand-feeding—dry lot.

All lots were given the same basic ration throughout the test which at first consisted of two parts oats, one part barley and one part shorts. Shorts was gradually replaced by barley chop. Toward the finishing period the percentage of barley chop was increased and finally made up three-fourths of the ration. Where tankage was used it was fed in the proportion of 8 per cent of the meal ration. The amount of meal given as a daily ration was equal to 4 per cent

and 5 per cent for medium and heavy hand-feeding respectively. At two wee periods each lot was weighed and the ration for the following two weeks w based on these weights. As the pigs increased in weight the amount consume per 100 pounds live weight was decreased. Two weeks before the completio of the test each lot was given all they would consume. The pasture plots use were approximately one-eighth of an acre in extent and were sown to rap during the second week in May. At the time the experiment was started th rape was of a very luxuriant growth and was about eighteen inches high. A lots on pasture had an abundance of rape during the entire season.

Each lot in dry lot was confined to lots identical in area with the pastur lots, the only difference being that the dry lot pigs did not have access to gree feed of any kind throughout the experiment and were entirely dependent fo their nourishment on the grain mixture supplied in the self-feeder and trough The pigs in all groups were watered twice daily, which meant that as a gener rule water was before the pigs at all times. A-shaped portable cabins approxi mately 6 by 8 feet in size supplied shade and shelter, one of these cabins bein available for each lot of eight hogs.

The meal was fed dry to all hand-fed lots twice daily. A mineral mixtur of slacked coal, bone meal and salt was before all lots constantly. Unfavour able weather conditions necessitated the completion of the experiment on Octobe 31. The pigs in each lot that were not up to market weight at this time wer finished off in the main piggery and their identity retained in order to secur the correct grading when the required market weights were reached.

METHODS OF FEEDING HOGS—PROPORTIONS AND QUANTITY FED

Lots	Number of hogs	Number of days on test	How fed	Meal rations fed	Other feeds
1	8	112 days July 11 to Oct. 31	Self-fed	First 30 days— Ground oats, 2 parts Ground barley, 1 part Shorts, 1 part Tankage, 8 p.c.	Rape pasture
				Second 30 days— Ground oats, 2 parts Ground barley, 2 parts Shorts, 1 part Tankage, 8 p.c.	Rape pasture
				Last 52 dats of test— Ground barley, 3 parts Ground oats, 1 part Tankage, 8 p.c.	Rape pasture
2	8	112	Heavy hand-feeding	Same as Lot 1	Rape pasture
3	8	112	Medium hand-feeding	Same as Lot 1	Rape pasture
4	8	112	Self-fed	Same meal mixture as Lot 1, no tankage	Rape pasture
5	8	112	Heavy hand-feeding	Same as Lot 4	Rape pasture
6	8	112	Medium hand-feeding	Same as Lots 4 and 5	Rape pasture
7	8	112	Self-fed	Same as Lot 1	Dry lot
8	8	112	Heavy hand-feeding	Same as Lot 1	Dry lot
9	8	112	Medium hand-feeding	Same as Lot 1	Dry lot

Prices charged for feeds—

Ground oats	50 cents a bushel
Ground barley	70 cents a bushel
Shorts	$25.00 a ton
Tankage	$50.00 a ton

NOTE.—No charge was made for pasture

The results of this test are given in the following table:—

METHODS OF FEEDING HOGS

—	Lot 1 Tankage, self-feeder, rape pasture	Lot 2 Tankage, heavy feeding, rape pasture	Lot 3 Tankage, medium feeding, rape pasture	Lot 4 No protein self-feeder, rape pasture	Lot 5 No protein heavy feeding, rape pasture	Lot 6 No protein medium feeding, rape pasture	Lot 7 Tankage, self-feeder, dry lot	Lot 8 Tankage, heavy feeding, dry lot	Lot 9 Tankage, medium feeding, dry lot
Number of hogs in experiment	8	8	8	8	8	8	8	8	8
Gross weight July 11 lb.	568	568	568	568	565	570	565	566	564
Average weight July 11 lb.	71·0	71·0	71·0	71·0	70·6	71·2	70·6	70·7	70·5
Gross weight October 31 lb.	1,431	1,260	1,254	1,408	1,311	1,276	1,465	1,323	1,232
Average weight October 31 lb.	178·9	157·5	156·7	176·0	163·9	159·5	183·1	165·3	154·0
Total gain for period (112 days) lb.	863	692	686	840	746	706	900	757	668
Average gain per animal for period lb.	107·9	86·5	85·7	105·0	93·2	88·2	112·5	94·6	83·5
Average daily gain per animal lb.	0·96	0·77	0·76	0·94	0·83	0·79	1·00	0·84	0·74
Amount of meal eaten by group lb.	5,100	3,645	3,461	5,186	3,918	3,674	5,359	4,200	3,778
Amount of tankage consumed by group lb.	408	292	277	415	313	294	429	336	302
Cost of protein supplement for lot $	10 20	7 30	6 92	10 37	7 82	7 35	10 72	8 40	7 55
Amount of meal eaten per pound gain lb.	5·91	5·27	5·04	6·17	5·25	5·20	5·95	5·55	5·65
Amount of tankage per pound gain lb.	0·47	0·42	0·40	0·49	0·42	0·42	0·48	0·44	0·45
Total cost of feed (including tankage) $	83 01	59 32	56 33	84 41	63 76	59 80	87 22	68 36	61 48
Cost of feed per head $	10 38	7 41	7 04	10 55	7 97	7 47	0 90	8 54	7 68
Cost of feed per head per day cents	9·27	6·62	6·28	9·42	7·12	6·67	9·73	7·62	6·86
Cost of feed to produce one pound gain "	9·62	8·57	8·21	10·05	8·55	8·47	9·69	9·03	9·20
Profits per head at 10·50 cents per pound less cost of feed $	8 40	9 12	9 42	7 93	9 24	9 27	8 32	8 82	8 48
Number of hogs grading select on foot	1	4	5	0	4	4	1	4	5

DEDUCTIONS.—*Methods of Feeding.*—Of the six lots that were fed on rape pasture the self-fed lots made on the average the largest gains, but with the higher meal consumption and at greater cost. This may be accounted for, in part at least, by taking into consideration the fact that the self-fed hogs made very little use of pasture available while the hand-fed hogs took more exercise and helped themselves to more of the green forage.

A comparison of average results of heavy hand-feeding and medium hand-feeding shows the heavy hand-feeding to result in greater gains with a higher meal consumption, but in returns over cost of feed very little difference from the two methods of feeding is found.

Protein Supplements.—In comparing lots 1, 2 and 3 fed tankage on rape pasture, with lots 4, 5 and 6 fed no protein supplement on rape pasture, it is seen that on the average the results show very little difference either in cost per pound of gain or in daily gains made. These results would seem to indicate that it is not necessary to add tankage as a protein supplement to the meal ration and when pigs have rape pasture available. The results obtained in this test may be attributed, in part at least, to the fact that the chemical analysis of rape shows it to have a relatively high protein content.

Pasture.—The use of pasture did not result on the average in higher daily gains but did result in more economical gains. On the average lots 1, 2 and 3, fed tankage on rape pasture, required 31·0 pounds less meal for each 100 pounds of gain than those fed tankage in dry lot. This means that it cost

50·7 cents more per 100 pounds gain to feed in dry lot. The figures in t accompanying table emphasize the importance of supplying pasture for growi pigs and more especially should this be the case when the concentrates are f in limited quantities.

In comparing the results between the self-feeder with tankage on ra pasture, and the self-feeder with tankage in dry lot, the difference in ga and feed required per pound of gain, are found to be very small, indicating th the self-fed hogs failed to make use of the pasture available. With the sel feeder, dry lot was 99·3 per cent as efficient as rape pasture showing that t values of pasture was not much over that of dry lot when self-feeder was us It was observed throughout the feeding period that the self-fed hogs we inclined to lie around near the self-feeder, take little exercise, and eat ve little rape.

Type.—The self-fed lots of hogs were the most uniform but because th took very little exercise and were "full-fed" at all times, they resembled mo the thick smooth type of hog than did the hand-fed lots, indicating that t method of feeding and the quantity of feed fed in this test had an influen on the type of hog at market weight.

Observations made on the medium and heavily hand-fed groups duri the progress of the experiment, showed the medium hand-fed hogs to lack t uniformity of the heavily hand-fed lots, but to more nearly approach the sele bacon type.

An average of the results of lots 1, 2 and 3 on pasture and lots 7, and 9 in dry lot, show a slightly higher percentage of selects to be produc in dry lot than on pasture but the difference is slight and it can scarcely b said that one method of management is better than the other. Any differen in favour of the pigs fed in dry lots may have been due to the sunscalding some of the pigs on pasture. Owing to the very numerous showers during th past summer the different pastures were frequently quite wet and this caus much more scalding than usual.

The results would indicate that:—

1. Self-fed pigs make greater gains but less economical gains than hand fed pigs.

2. Self-fed pigs show greater uniformity than hand-fed pigs but for th production of bacon carcasses self-feeding is less desirable than hand-feeding.

3. Self-fed pigs fail to make the best use of available pasture.

4. The addition of tankage to the meal ration of pigs on rape pasture di not increase the rate or economy of gain.

5. Pigs on pasture made more economical gains than pigs on dry lot.

PROTEIN AND MINERAL SUPPLEMENTS FOR REARING FALL PIGS

Objects of Experiment.—1. To compare tankage and oil-cake meal a protein supplements.

2. To ascertain the advantage of adding protein supplements to the ratio of the fall pig.

3. To determine if any advantage is to be gained in the feeding of miner when tankage is being fed.

4. To compare the relative values of a simple mineral mixture containi salt, and salt alone for growing pigs.

5. To obtain additional information on the cost of production and prof in raising fall pigs.

Plan of Experiment.—Thirty-six pigs were used in this experiment comprising 23 pure-bred Yorkshires, 4 pure-bred Berkshires, 2 pure-bred Tamworths and 7 crosses from these three breeds. These pigs were divided into six groups with six pigs in each group. As even a distribution as possible was made with respect to age, type, sex, average weight and general thrift. Previous to the beginning of the test the feeding and management of all pigs was practically the same. All lots were fed the same grain ration throughout the test. In addition lot 1 received tankage, lot 2 tankage and minerals and lot 3 oil-cake meal and minerals. Lot 4 received minerals, lot 5 received salt and lot 6 received the meal ration without additions. Tankage and oil-cake meal were fed at the rate of 7 per cent of the meal ration, minerals at the rate of 2 pounds per lot daily and salt at the rate of 4 ounces per lot daily. The minerals and the salt were mixed with the meal ration which was hand-fed in the dry state. All grain was ground, and fed twice per day. Water was supplied in a separate trough. The mineral mixture fed was: Slacked coal, 164 pounds; bone meal, 20 pounds; salt, 15 pounds; and iron sulphate, 1 pound.

PROTEIN AND MINERAL SUPPLEMENTS FOR FALL PIGS—PROPORTION AND QUANTITIES FED

Lots	Number of hogs	Breed	Number of days fed	Meal ration fed	Other feeds
1	6	Yorkshires, Tamworths Berkshires and crosses from these three breeds.	83	First 22 days— Oat chop, 3 parts, Barley chop, 1 part, Shorts, 1 part, Bran, ¼ part. Second 30 days— Barley chop, 2 parts, Oat chop, 1 part, Shorts, 1 part, Bran, ¼ part. Last 31 days of test— Barley chop, 2 parts, Oat chop, 1 part.	7 per cent tankage.
2	6	Same as above.....	83	Same as above.....	7 per cent tankage plus minerals.
3	6	Same as above.....	83	Same as above.....	7 per cent oil-cake meal plus minerals.
4	6	Same as above.....	83	Same as above.....	Minerals.
5	6	Same as above.....	83	Same as above.....	4 ounces salt per pen daily.
6	6	Same as above.....	83	Same as above.....	

Housing.—All lots were fed outside and had well banked portable cabins with openings to the south for sleeping quarters. The feeding-lots 12 feet by 24 feet adjoined each cabin which provided space for limited exercise, and the feed-trough.

PROTEIN AND MINERAL SUPPLEMENTS FOR FALL PIGS

—		Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6
		Tankage	Tankage and minerals	Oil-cake meal and minerals	Minerals	Salt	Meal only
Number of hogs in experiment		6	6	6	6	6	6
Gross weight, March 10, 1927	lb.	590	591	597	580	597	580
Average weight, March 10, 1927	"	98·3	98·5	99·5	96·7	99·5	96·7
Gross weight, May 31, 1927	"	1,169	1,142	1,135	1,071	1,045	895
Average weight, May 31, 1927	"	194·8	190·3	189·2	178·5	174·2	149·2
Total gain per lot during test (83 days)	"	579·0	551·0	538·0	491·0	448·0	315·0
Average gain per animal for period	"	96·5	91·8	89·7	81·8	74·7	52·5
Average daily gain per animal	"	1·16	1·11	1·08	0·98	0·90	0·6
Oat chop consumed at 1·5 cents per pound plus $1.50 per ton for crushing	"	1,000	1,000	1,000	1,000	1,000	1,000
Barley chop at 1·5 cents per pound plus $1.50 per ton for crushing	"	1,358	1,358	1,358	1,358	1,358	1,358
Shorts at $1.35 per hundred	"	374	374	374	374	374	374
Bran at $1.25 per hundred	"	92	92	92	92	92	92
Tankage at $2.50 per hundred	"	198	198	.....	.....	.....	.....
Oil-cake meal at $2.50 per hundred	"	.....	.....	198	.....	.....	.....
Mineral mixture at 62 cents per 100 pounds	"	.....	162	162	162	.....	.....
Salt at 1·8 cents per pound	"	.....	.....	.....	.....	20·75	.....
Amount of meal eaten by group (Supplements not included)	"	2,824	2,824	2,824	2,824	2,824	2,824
Cost of protein supplement per lot	$	4 95	4 95	4 95	.....	.....	.....
Cost of mineral mixtures per lot	$	.....	1 00	1 00	1·00	.....	.....
Cost of salt fed	$	.....	.....	.....	.....	0 37	.....
Amount of meal eaten per pound gain	lb.	4·89	5·12	5·25	5·75	6·30	8·4
Amount of tankage eaten per pound gain	"	0·34	0·36	.....	.....	.....	.....
Amount of oil-cake meal eaten per pound gain	"	.....	.....	0·37	.....	.....	.....
Amount of mineral mixture eaten per pound gain	"	.....	0·29	0·30	0·33	.....	.....
Amount of salt eaten per pound gain	"	.....	.....	.....	.....	·046	.....
Total cost of feed	$	48 29	49 29	49 29	44 34	43 71	43
Cost of feed per head	$	8 05	8 21	8 21	7 39	7 28	7
Cost of feed per head per day	cts.	9·70	9·89	9·89	8·90	8·77	8·7
Cost of feed to produce one pound gain	"	8·34	8·94	9·16	9·03	9·76	13·7
Profit per head over cost of feed when sold at 10 cents per pound, labour neglected	$	11 43	10 82	10 70	10 46	10 13	7

Summary.—Lot 1 which received tankage in addition to the meal ration made the highest daily gains, the most economical gains and returned the highest net profit.

Lot 6 which received the meal ration without additions made the lowest daily gains and returned the least net profit.

A comparison of lots 1 and 2 shows the tankage group without mineral to make 0·05 higher daily gains and to produce these gains at a cost of 0·6 cents less per pound than the lot with minerals, indicating that tankage apparently carries all the mineral matter required by growing pigs and that no benefit is to be derived from the feeding of minerals to pigs receiving a seven per cent tankage allowance.

In comparing lot 2 fed tankage and minerals and lot 3 fed oil-cake meal and minerals, it will be seen that the results do not show very much difference either in respect to cost per pound gain or to daily gains made, indicating that oil-cake meal, with minerals fed in addition, proved a satisfactory protein supplement and can be used to advantage in place of tankage.

Lot 4 receiving the mineral mixture of slacked coal, bone meal, salt and iron sulphate, in addition to the meal ration, made 0·08 higher daily gains and produced these gains at a cost of 0·73 cents less per pound than lot 5, fed only salt as a supplement, indicating that the use of salt alone did not prove as effective as a mineral mixture which contains salt along with other ingredients. On the other hand, in comparing lots 5 and 6, it is found that the lot receiving salt made 0·27 higher daily gains with a meal consumption of 266 less meal per 100 pounds gain than the control lot, indicating that the feeding of salt materially increases the daily gains and reduces the feed required for 100 pounds gain.

The outstanding factor in this experiment is the economy of gains which it is possible to make when the meal ration for fall pigs is supplemented with a protein or mineral supplement.

A study of this experiment leads to the following conclusions:—

1. That all lots of fall pigs returned a fair profit over feed cost.

2. That the addition of protein and mineral supplements to the meal ration results both in greater daily gains and in more economical gains.

3. That a mineral mixture consisting of slacked coal, bone meal, salt and iron sulphate was more economical than salt only.

4. That giving salt to pigs not receiving protein or minerals resulted in increased and more economical gains.

5. That there was no advantage to be gained in the feeding of minerals when tankage was being fed. The addition of minerals to the ration of pigs receiving tankage increased the cost of gains without resulting in any increase in the daily gains.

6. That oil-cake meal ranks high as a protein supplement feed and can be used to advantage in place of tankage.

TANKAGE VS. SKIM-MILK VS. SHORTS, MIDDLINGS AND BRAN

Objects of Experiment.—1. To obtain additional information on the cost of production and profit in raising fall pigs.

2. To ascertain the advantage of adding tankage to the ration of the fall pig.

3. To determine the value of tankage after skim-milk is fed for fifty days.

4. To compare a home-grown ration of oats and barley with one containing oats, barley and other ingredients.

5. To determine the value of tankage when oats, barley, shorts, middlings and bran are being fed.

Plan of Experiment.—Thirty Yorkshire pigs were divided into six lots of five each. As even a distribution as possible was made with respect to age, breeding, type and general thrift of the pigs. Lot 1 received a home-grown ration consisting of oats and barley. Lot 2 received the same ration with the addition of 7 per cent tankage. Lots 3 and 4 received the same basic ration as lots 1 and 2, with the addition of skim-milk for the first fifty days of the test. After the 50-day period Lot 3 was fed 7 per cent digester tankage until the completion of the experiment and Lot 4 no tankage or skim-milk after this time. Lot 5 received a ration consisting of oats, barley, shorts, middlings and bran, and lot 6 received the same ration with the addition of 7 per cent digester tankage.

TANKAGE VS. SKIM-MILK VS. SHORTS, MIDDLINGS AND BRAN—PROPORTIONS AND QUANTITIES FED

Lot	Number of hogs	Breed	Number of days fed	Meal ration fed	Other feeds
1	5	Yorkshire	127	First 50 days— Oat chop, 3 parts, Barley chop, 1 part, Last 77 days of test— Oat chop, 1 part, Barley chop, 1 part.	
2	5	Yorkshire	127	Same as Lot 1	7 per cent tankage.
3	5	Yorkshire	127	Same as Lot 1	Skim-milk first 50 days, then replaced with 7 per cent tankage.
4	5	Yorkshire	127	Same as Lot 1	Skim-milk first 50 days only.
5	5	Yorkshire	127	Oat chop, 3 parts, Barley chop, 1 part, Shorts, 1 part, Middlings, ½ part, Bran, ¼ part.	
6	5	Yorkshire	127	Same as Lot 5	7 per cent tankage.

The pigs were farrowed in July and August and the average age at the beginning of the experiment was three months. All lots were sheltered in 6 feet by 8 feet gable type portable cabins banked to the eaves with straw. Bedding was changed whenever necessary to keep the cabins dry. The cabins faced the south and feeding-lots each 12 feet by 24 feet adjoined each cabin, providing space for limited exercise and the feed-trough. Feeding was done by hand and all meal was fed dry, skim-milk being fed after the meal had been cleaned up. All grain was ground and fed on a feeding platform twice a day. The mineral mixture fed was: slacked coal, 164 pounds; bone meal, 20 pounds; salt, 15 pounds; and iron sulphate, 1 pound.

The results of the test are given in the following table:—

TANKAGE VS. SKIM-MILK VS. SHORTS, MIDDLINGS AND BRAN

—		Lot 1 Oats, and barley	Lot 2 Oats, barley and tankage	Lot 3 First period 50 days, oats, barley, and skim-milk, second period 77 days, oats, barley and tankage	Lot 4 First period 50 days, oats, barley and skim-milk, Second period 77 days, no tankage	Lot 5 Oats, barley, shorts, middlings and bran	Lot 6 Oats, barley, shorts, middlings, bran and tankage
Number of hogs in experiment		5	5	5	5	5	5
Gross weight November 1, 1926	lb.	254	321	310	327	341	330
Average weight November 1, 1926	"	50·8	64·2	62·0	65·4	68·2	66·0
Gross weight March 7, 1927	"	666	770	818	824	943	896
Average weight March 7, 1927	"	133·2	154·0	163·6	164·8	188·6	179·2
Total gain per lot during test (127 days)	"	412	449	508	497	602	566
Average gain per animal per period	"	82·4	89·8	101·6	99·4	120·4	113·2
Average daily gain per animal	"	0·65	0·71	0·80	0·78	0·95	0·89
Oat chop consumed at 1·2 cents per pound plus $1.50 per ton for crushing	"	1,780	1,780	1,780	1,780	909	909
Barley chop consumed at 1·2 cents per pound plus $1.50 per ton for crushing	"	1,147	1,147	1,147	1,147	1,207	1,207
Shorts at $1.35 per hundred	"	.....	.....	.....	.....	448	448
Middlings at $1.70 per hundred	"	.....	.....	.....	.....	204	204
Bran at $1.25 per hundred	"	.....	.....	.....	.....	159	159
Skim-milk at 20 cents per hundred	"	.....	.....	600	600	.....	.....
Tankage at $2.50 per hundred	"	.....	210	120	.....	.....	210
Amount of meal eaten by group (tankage not included)	"	2,927	2,927	2,927	2,927	2,927	2,927
Cost of protein supplement per lot	$	.....	5 25	4 20	1 20	.....	5 25
Amount of meal eaten per pound gain	lb.	7·10	6·52	5·76	5·89	4·86	5·17
Amount of skim-milk eaten per pound gain	"	.....	.....	1·18	1·21	.....	.....
Amount of tankage eaten per pound gain		.....	0·47	0·24	.....	.....	0·37
Total cost of feed	$	37 31	42 56	41 51	38 51	38 48	43 73
Cost of feed per head	"	7·46	8·51	8·30	7·70	7·70	8·75
Cost of feed per head per day	cts.	5·87	6·70	6·53	6·06	6·06	6·89
Cost of feed to produce one pound gain	"	9·05	9·48	8·17	7·75	6·39	7·73
Profit per head over cost of feed when sold at 12 cents per pound, labour neglected	$	8 53	9 97	11 33	12 08	14 93	12 75

RESULTS.—Lot 5 fed the ration consisting of oats, barley, shorts, middlings and bran for the full period made the greatest gains, the most economical gains and returned the highest net profit.

Lot 6 fed the same basic ration as lot 5 with the addition of 7 per cent digester tankage ranked next in economy of gains showing a feed cost per pound of gain of 1·34 cents more than lot 5 without tankage, while the average daily gain per hog was 0·89, or 0·06 of a pound less. These results would seem to indicate that no advantage is to be gained in feeding tankage when a mixture of oats, barley, shorts, middlings and bran is being fed.

The lot on oats, barley and skim-milk for the first 50 days and 7 per cent tankage after the fiftieth day period, stood next in total gains with 0·80 of a pound per hog per day but not in economy of gains as the cost of the tankage added greatly to the total cost of the ration, making the feed cost per pound of gain to be 0·42 cents greater than lot 4 without tankage.

Lot 1 fed oats and barley only for the full period made the lowest gains and returned the least net profit.

A comparison of lots 1 and 2 shows that the addition of tankage to an oat and barley ration resulted in increased daily gains and slightly lowered the feed requirement for 100 pounds gain.

A comparison of lots 2 and 3 will show that the addition of skim-milk for the first fifty days of the test followed by digester tankage gave rise to higher and much more economical gains than when tankage was fed for the full period. These results therefore would show skim-milk to be a more economical feed than tankage to supplement the meal ration and its real value would seem to be in its ability to give the young pigs a good start. After the pig reaches 100 pounds in weight the importance of adding some form of protein supplement would seem to be lessened. This fact is further borne out when we compare lots 3 and 4 which show tankage to exert very little influence on the rate and economy of gains after the fiftieth-day period had passed.

The addition of shorts, middlings and bran to an oat and barley ration proved highly beneficial. Lot 5 made fairly consistent gains throughout the period whereas the pigs fed a ration of oats and barley only, made very slow gains. The average daily gain for lot 1 was ·65 as compared with ·95 for lot 5. Lot 5 also made a considerably better showing from the standpoint of economy of gains than the pigs fed only an oat and barley ration. The pigs fed oats, barley, shorts, middlings and bran required 486 pounds of grain for 100 pounds gain, while the pigs fed no shorts, middlings and bran required 710 pounds of grain for 100 pounds of gain. It cost $2.66 less to produce 100 pounds gain in lot 5 than in lot 1. These figures stand as a strong argument in favour of the use of a variety of feeds in the ration of fall pigs.

Deductions.—1. All lots of pigs returned a fair profit over feed cost.

2. The addition of tankage to an oat and barley ration increased the daily gains and the economy of gains.

3. The supplementing of a well-balanced ration with tankage is not economical.

4. The supplementing of an oat and barley ration with shorts, middlings and bran is economical.

5. Tankage did not prove as economical as skim-milk as a protein supplement for fall pigs.

6. The addition of skim-milk for the first fifty days of the test proved highly beneficial and its special value would seem to be in its ability to get the young pigs away to a good start.

7. Oats and barley without additions is not a satisfactory ration for fall pigs.

FIELD HUSBANDRY

The results of experiments with cultural methods, fertilizers and farm rotations are reported under this Division.

In reviewing this work it is well for the reader to keep in mind that the land on which the experiments were conducted is a dark friable loam and that the annual precipitation averages slightly over seventeen inches. Approximately sixty per cent of the precipitation occurs during the growing season.

CROP ROTATIONS

Fifteen rotations are under test at the present time. Accurate cost of production figures are kept in these experiments The actual time required for the different field operations as well as the amount of seed, twine, manure, etc., is recorded. These, along with land rental, and use of machinery rental, are

charged against the crop produced, while the crop produced is credited with the value of the crop if placed on the market during the regular marketing season.

The following values are used in computing the cost of production in the rotation experiments:—

Cost Values

Rent, per acre	$ 4 00
Manure, per ton	1 00
Wheat per bushel	1 25
Barley, per bushel	0 60
Oats, per bushel	0 50
Fall rye, per bushel	0 90
Corn, per bushel	3 00
Potatoes, per bushel	1 00
Mangels, per pound	0 70
Sunflowers, per hundred pounds	13 00
Timothy, per hundred pounds	18 00
Sweet clover, per hundred pounds	13 00
Alfalfa, per hundred pounds	35 00
Alsike, per hundred pounds	20 00
Rye grass, per hundred pounds	13 00
Brome grass, per hundred pounds	13 00
Red clover, per hundred pounds (Altaswede)	35 00
Machinery, per acre	1 35
Tractor, per hour	0 48
Silo filling machinery, per ton	0 25
Kerosene, per gallon	0 27
Gear oil, per gallon	1 25
Pasture, per month	1 50
Manual labour, per hour	0 30
Horse labour, per hour	0 08
Binder twine, per hundred	16 00
Threshing per bushel—wheat and rye	0 10
barley	0 08
oats	0 06

Return Values

Wheat, per bushel	1 15
Barley, per bushel	0 60
Oats, per bushel	0 50
Winter rye, per bushel	0 60
Sweet clover, per ton	10 00
Alfalfa, per ton	15 00
Mixed hay, per ton	12 00
Greenfeed, per ton	8 00
Straw, per ton	1 00
Ensilage, per ton	4 00
Potatoes, per ton	20 00
Pasture, per month	1 50
Timothy, per ton	15 00
Roots	5 00

The following explanation of the above cost and return values may be of interest:—

All cost of production figures are reduced to the basis of one acre, although the size of the blocks vary from one to forty acres.

Rent.—The amount of rent is obtained by charging the value of the land with the current rate of interest as obtained on first mortgages; to this is added the amount of taxes per acre.

Manure.—The charge for manure covers only the cost of applying the manure to the land, and does not include any additional value it may have. The data available at present indicate that it is doubtful if the direct profits from the application of barnyard manure more than compensate for the expense of applying it. The cost of applying the manure is distributed equally among all the crops in the rotation.

Manual Labour.—The rate for manual labour is an average of the prevailing summer wages for hired help in the district. The number of hours charged against a crop includes only that required to complete the work under average farm conditions, and includes all work required in the growing, harvesting and storing of the crop.

Horse Labour.—The rate for horse labour includes the cost of feed, th interest on the value of the horse, the depreciation in the value of the horse an harness, as well as the value of the manual labour required to care for the hors

Machinery.—The charge for farm machinery was established to cover th interest and depreciation on the machinery used on an average farm. Whe a tractor is used, a rate per hour is charged to cover depreciation and interes on investment in tractor used. Where silo-filling machinery is used, the charg per ton for cutting the ensilage is sufficient to cover the rental of the machinery

Threshing.—The charge per bushel for threshing covers the total cos incurred from stook to granary, and is representative of the price charged o custom work in the district.

Grass and Clover Seed.—The grass and clover seeding, when it does no fail, is distributed equally to each hay and pasture year in the rotation; whe it does fail and there is no hay crop, the charge is made against the whol rotation and not against any one crop.

Summer-fallow.—The charges against the summer-fallow include ren machinery and labour. The first crop following summer-fallow is charged wit two-thirds of the cost of summer-fallowing, while the second crop is charge with one-third of the cost.

Ensilage.—Ensilage is given a value on the basis of 300 pounds of silag in the silo being equal to 100 pounds of hay in the mow or stack.

Roots.—Owing to their varying feeding value when fed in different amount and to different kinds of animals, an arbitrary value is given. This value i based on the cost of production and observations during actual feeding tests.

Miscellaneous.—The cost values of seeds, twine, oil, etc., are the actua values for the year in the district for the class of material used. The retur values which are used are market prices on November 1.

ROTATION "O"

First year—Hoed crop, potatoes.
Second year—Wheat.
Third year—Oats.
Fourth year—Summer-fallow.
Fifth year—Wheat, seeded with 10 pounds alfalfa and 10 pounds weste rye grass per acre.
Sixth year—Hay manured with 15 tons per acre after harvest.
Seventh year—Hay, broken early after harvest and cultivated for th balance of the season.

ROTATION "O"—SEVEN YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS, PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
		1927	Average			1927	Averag
		bush.	bush.	$	$	$	$
1	Hoed crop, potatoes (8 years)	212·3	229·7	127 40	60 86	66 54	46 8
2	Wheat (16 years)	40·5	34·5	48 23	16 41	31 82	21 2
3	Oats (16 years)	72·7	56·5	38 00	17 74	20 26	12 9
4	Summer-fallow (16 years)	.....	.....	.....	−8 55	−8 55	−9 2
5	Wheat (wheat for last 5 years)	27·8	25·7	34 04	19 18	14 86	9 8
		tons	tons				
6	Hay (14 years)	2·77	1·51	23 24	14 94	18 30	5 6
7	Hay (5 years)	2·10	1·26	25 20	14 20	11 00	4 6
	Totals for rotation	.....	.....	306 11	134 78	154 23	92 1
	Average per acre	.....	.....	43 73	19 25	22 03	13 1

Rotation "O" is a mixed farming rotation suitable for most districts in the park belt of Alberta. It is a particularly good rotation in that it has three cash crops in wheat and oats, one cleaning crop in an intertilled crop, one year in summer-fallow and two mixed hay crops. The wheat crops, following the intertilled crop and summer-fallow as they do, tend to have both productiveness and profitableness assured by being so placed. The hay crop, although one of the least profitable crops grown at the Station, is essential in maintaining the root fibre and organic matter of the soil. It also provides a crop sequence which tends to maintain fertility. The two years in hay when top dressed with manure are apparently increasing the fertility of this rotation.

Barley was the crop used to follow summer-fallow previous to 1922, when wheat was substituted. The reason for making the change was that the summer-fallow preparation is ideal for wheat and since wheat is more profitable and a better nurse crop than barley it seemed wise to make the change.

A change was also made in the last year of the rotation from pasture to hay because pasture is less profitable than hay.

This rotation produced an average profit per acre of $13.86 since it was started. It is the most profitable of the rotations which have been under test for a number of years.

ROTATION "K"

First year—Hoed crop, corn.
Second year—Wheat.
Third year—Barley, seeded down with 10 pounds alfalfa and 10 pounds western rye per acre.
Fourth year—Hay, manured 15 tons per acre after harvest.
Fifth year—Hay.
Sixth year—Hay, broken early in August and cultivated for balance of season.

ROTATION "K"—SIX YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
		1927	Average			1927	Average
		tons	tons	$	$	$	$
1	Corn (7 year average)	11·34	7·94	45 36	23 89	21 48	11 53
		bush.	bush.				
2	Wheat (16 year average)	23·6	28·7	27 14	16 91	10 23	14 44
3	Barley (16 year average)	.....	30·6	1 53	12 63	−11 10	5 43
		tons	tons				
4	Hay (15 year average)	2·03	1·39	24 36	13 35	11 01	5 78
5	Hay (6 year average)	3·27	1·40	39 24	15 81	23 43	8 96
6	Hay (5 year average)	2·09	1·10	25 08	12 21	12 87	5 71
	Totals for rotation	.....	.....	162 71	94 80	67 92	51 85
	Average per acre	.....	.....	27 12	15 80	11 32	8 64

Rotation "K" is a mixed farming rotation designed for a district with precipitation such that a summer-fallow substitute will give better results than a bare fallow.

It will be noticed that this is not a very profitable rotation. The reason for this is that one-half the rotation is in hay. Since hay is the least profitable of the different crops grown it tends to lower the profitableness of the rotation. The profit from this rotation might be increased by reducing the years in hay to two years and changing the barley to wheat which is a better nurse crop and more profitable.

ROTATION " C "

First year—Summer-fallow.
Second year—Wheat.
Third year—Wheat.

ROTATION "C"—THREE YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
		1927	Average 14 years			1927	Average 14 years
		bush.	bush.	$	$	$	$
1	Summer-fallow	.....	.....	.....	−8 92	−8 92	−9 13
2	Wheat	33·5	31·7	41 88	12 99	28 89	18 47
3	Wheat	16·0	18·9	19 60	12 18	7 32	9 60
	Totals for rotation	.....	.....	61 48	16 25	27 29	19 00
	Average per acre	.....	.....	20 49	5 42	9 10	6 34

Rotation " C " is a straight grain growing rotation. It is the rotation most frequently followed in the grain growing districts of Central Alberta. While it has been reasonably profitable in the past it is not a method to be permanently followed for the reason that it is becoming more difficult to maintain clean land and avoid soil troubles. The land, although thoroughly summer-fallowed every third year, is becoming contaminated with noxious weeds and depleted in organic matter while rotation " O," on a mixed farming rotation on adjoining land, which includes hay crops and the application of barnyard manure, is apparently improving in the point where rotation " C " is falling down.

ROTATION " LACOMBE "

First year—Hoed crop, sunflowers.
Second year—Wheat, seeded with 10 pounds western rye and 10 pounds sweet clover per acre.
Third year—Hay.
Fourth year—Hay, broken after harvest.
Fifth year—Oat greenfeed, stubble fall-ploughed and rotted manure applied 10 tons per acre during the winter.

ROTATION "LACOMBE"—FIVE YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
		1927	Average 5 years			1927	Average 5 years
		tons	tons	$	$	$	$
1	Sunflowers	14·99	14·64	59 76	29 21	30 55	27 07
		bush.	bush.				
2	Wheat (4 years)	40·00	38·1	48 07	16 70	31 37	22 53
		tons	tons				
3	Hay (4 years)	2·88	1·89	34 56	14 26	20 30	13 90
4	Hay (3 years)	2·63	2·09	31 56	13 80	17 76	19 32
5	Oat green feed (3 years)	2·70	2·02	21 60	18 13	3 47	− 94
	Totals for rotation	.....	.....	195 55	92 10	103 45	82 88
	Average per acre	.....	.....	39 11	18 42	20 69	16 58

Rotation "Lacombe" is essentially a live stock rotation combining three of the most important forage crops used in central Alberta with one cash crop. There are some interesting points in connection with this rotation. Wheat following sunflowers produced 40 bushels per acre in 1927 and an average of 38·1 bushels per acre during the past 4 years. The catch of seeding in the wheat following sunflowers has been uniformly good since the rotation was first started. The explanation for the difference in the 1927 yield of sweet clover and the 5-year average may be found in the fact that previous to the 1926 crop the sweet clover always winter killed. When the sweet clover does not winter kill the mixture of sweet clover and rye grass produces a very heavy crop of excellent hay relished by both cattle and horses. In addition to this the second year of hay, which is pure rye grass, is decidedly one of our most productive crops. Apparently the decaying sweet clover roots furnish the plant food necessary for optimum development of the rye grass hay crop.

ROTATION "H"

First year—Wheat stubble spring-ploughed.
Second year—Oats.
Third year—Summer-fallow.
Fourth year—Wheat, seeded with 10 pounds alfalfa and 10 pounds western rye per acre.
Fifth year—Hay, 15 tons rotted manure applied in winter and harrowed in the spring.
Sixth year—Hay, broken after harvest.

ROTATION "H"—SIX YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
		1927	Average 5 years			1927	Average 5 years
		bush.	bush.	$	$	$	$
1	Wheat	26·0	27·0	31 62	17 71	13 91	11 46
2	Oats	51·0	43·6	26 80	14 34	12 46	5 53
3	Summer-fallow				8 92	−8 92	−9 85
4	Wheat	26·8	30·7	32 60	15 53	17 07	16 81
		tons	tons				
5	Hay (3 years)	2·20	1·75	26 40	16 09	10 31	9 46
6	Hay (3 years)	2·15	1·86	25 80	15 62	10 18	11 31
	Totals for rotation			143 22	88 21	55 01	44 72
	Average per acre			23 87	14 70	9 17	7 45

Rotation "H" is a mixed farming rotation that has produced most satisfactory results at the Dominion Experimental Farm, Brandon. It is very similar to Rotation "O" which has given excellent results at Lacombe. Rotation "H" is one of the most satisfactory mixed farming rotations under test at this Station.

This rotation made a profit of $9.17 per acre in 1927 and an average profit of $7.45 per acre during the past five years.

ROTATION "INTERTILLED"

First year—Wheat.
Second year—Wheat, stubble to be spring ploughed.
Third year—Wheat, half intertilled and half seeded 3 pecks per acre.

ROTATION "INTERTILLED"—THREE YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit per acre	
		1927	Average 5 years			1927	Average 5 years
		bush.	bush.	$	$	$	$
*1a	Wheat (seeded thinly)	38·0	18·5	45 45	13 85	31 60	20 06
2a	Wheat	24·0	22·7	29 40	11 58	17 82	11 07
3a	Wheat	32·0	23·0	38 50	12 29	26 21	10 79
*1b	Wheat (seeded in drills)	16·0	14·3	19 65	12 37	7 28	10 30
2b	Wheat	28·0	24·0	34 20	12 04	22 16	12 17
3b	Wheat	32·0	23·0	38 50	12 29	26 21	10 79
	Totals for rotation	.....	.....	.....	.....	.....	.....
	Average per acre	.....	.....	55 73	20 71	35 02	12 53

*1a and 1b are 3 year averages.

Rotation "Intertilled" is a straight grain growing rotation designed to compare wheat seeded thinly and in rows with the bare fallow of Rotation "C" as a preparation for wheat.

This rotation produced a profit of $35.02 in 1927 and an average profit of $12.53 during the last five years. While it has been reasonably profitable, it has not been satisfactory from the standpoint of weed control. Wild oats and other weeds have increased alarmingly. The grain growing in triple rows is not a cleaning crop in any sense of the word and since there is no cleaning crop in the rotation, the land on which it is conducted is producing a higher percentage of weeds in the crop each succeeding year.

ROTATION "SWEET CLOVER"

First year—Wheat, fall-plough stubble.

Second year—Wheat, half seeded with biennial sweet clover.

Third year—Hay, half seeded with annual sweet clover, stubble fall-ploughed.

ROTATION "SWEET CLOVER"—THREE YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production, 1927	Profit per acre	
		1927	Average, 5 years			1927	Average, 5 years
		bush.	bush.	$	$	$	$
1	Wheat	40·3	32·3	48 42	17 47	30 95	17 66
2	Wheat	30·0	28·3	34 50	13 87	20 63	15 07
3	Sweet clover (3 year average)	tons 2·2	tons 1·95	21 90	13 59	8 31	4 85
	Totals for rotation	.....	.....	104 82	44 93	59 89	37 58
	Average per acre	.....	.....	34 94	14 98	19 96	12 53

This rotation is similar to rotation "C" except that sweet clover takes the place of the summer-fallow. It has proven one of the most satisfactory rotations under test. It made a profit of $19.96 per acre in 1927 and an average profit per acre of $12.53 during the past five years. It will be noted that the yields of wheat produced compare favourably with those produced on fallowed land.

An interesting point came up in connection with this rotation during the past season in that foot-rots appeared to be worse in this rotation than in any other. This disease was very pronounced in the second year wheat which acts as a nurse crop for the sweet clover. As a result of seasonal conditions the sweet clover made a very vigorous growth and superseded the wheat as shown in the accompanying illustration.

ROTATION " MANITOBA "

First year—Wheat.

Second year—Wheat stubbled in.

Third year—Oats, on spring ploughing.

Fourth year—Summer-fallow.

ROTATION "MANITOBA"—FOUR YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production, 1927	Profit or loss per acre	
		1927	Average, 5 years			1927	Average 5 years
		bush.	bush.	$	$	$	$
1	Wheat	43·3	35·2	51 92	17 38	34 54	25 58
2	Wheat	34·3	27·3	39 50	12 83	26 67	17 44
3	Oats	61·0	48·7	32 00	13 98	18 02	7 98
4	Summer-fallow	.....	.....	.....	8 65	−8 65	−9 19
	Totals for rotation	.....	.....	123 42	52 84	70 58	41 81
	Average per acre	.....	.....	30 85	13 21	17 65	10 45

Rotation " Manitoba " is a straight grain growing rotation which has been used extensively by grain growers throughout the West. It produced a profit of $17.65 per acre in 1927 and an average profit of $10.45 per acre during the past five years.

It is to be expected that this rotation will be similar to Rotation " C " in that when it has progressed for a number of years, numerous weed and soil hygiene problems will develop. It appears to be a very satisfactory rotation in central Alberta while the land is new and in good tilth.

ROTATION " L "

First year—Hay.

Second year—Hay manured in autumn, 12 tons per acre.

Third year—Hay, broken after harvest six inches deep and cultivated for balance of season.

Fourth year—Wheat.

Fifth year—Oats.

Sixth year—Barley, seeded with 4 pounds timothy, 4 pounds alsike, and 4 pounds red clover per acre.

ROTATION "L"—SIX YEARS—SUMMARY OF YIELDS—VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop, 1927	Cost of production 1927	Profit or loss per acre	
		1927	Average 5 years			1927	Average 5 years
		tons	tons	$	$	$	$
1	Hay (4 year average)	2·45	1·32	28 40	12 88	15 52	5 77
2	Hay (3 year average)	2·26	1·55	27 12	11 73	15 39	9 17
3	Hay (3 year average)	2·14	1·33	25 68	11 53	14 15	7 35
		bush.	bush.				
4	Wheat	31·6	29·4	38 60	18 78	19 82	14 10
5	Oats	53·3	46·4	27 98	14 93	13 05	7 00
6	Barley	32·6	25·6	20 98	13 76	7 22	1 13
	Totals for rotation	.....	.....	168 76	83 61	85 15	44 52
	Average per acre	.....	.....	28 13	13 93	14 19	7 42

Rotation "L" is a mixed farming rotation designed for districts where summer-fallowing results in too heavy a growth of straw. It is a very satisfactory rotation in wet years, it was unsatisfactory during the dry years of 1920-21-22.

Rotation "L" produced a profit per acre of $14.19 in 1927 and an average profit per acre of $7.42 during the past five years.

One disadvantage this rotation has is the hay mixture used which is not satisfactory in a dry year. In dry years the red clover kills out badly and the timothy produces a very light crop. It will be noted that the yields produced in 1927, a wet year, compare favourably with those produced by any other hay mixture. This mixture has produced but two good hay crops during the past seven years.

ROTATION "FALL RYE"

First year—Wheat, 15 tons rotted manure applied during the winter and ploughed under in spring.

Second year—Oats for silage, fall rye seeded on disked oat stubble.

Third year—Fall rye.

Fourth year—Summer-fallow.

ROTATION "FALL RYE"—FOUR YEARS—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit or loss per acre	
		1927	Average 5 years			1927	Average 5 years
		bush.	bush.	$	$	$	$
1	Wheat	33·6	35·2	40 73	18 11	22 62	20 84
		tons	tons				
2	Oats for silage (4 years)	10·0	7·30	40 24	23 86	16 38	8 29
		bush.	bush.				
3	Winter rye (3 years)	25·3	33·0	17 18	17 95	−0 77	−3 14
4	Summer-fallow	.....	.....	.....	8 81	−8 81	−9 07
	Totals for rotation	.....	.....	98 15	68 73	29 42	16 92
	Average per acre	.....	.....	24 54	17 18	7 36	4 23

Rotation "Fall Rye" is a mixed farming rotation which has many things to commend it. It has given excellent results with respect to yield but has never proven very profitable for the reason that fall rye sells at a relatively

low price. If sweet clover were spring seeded with the fall rye and a crop of sweet clover harvested instead of the summer-fallow, it is possible that the rotation would be more profitable, the winter rye as effectively controlled, and the yield of wheat as large as with the present rotation.

This rotation produced a profit of $7.36 during 1927 and an average profit of $4.23 per acre during the past five years.

ROTATION "BROME"

Brome grass is grown continuously in this rotation.

ROTATION "BROME"—CONTINUOUSLY—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit per acre	
		1927	Average 4 years			1927	Average 4 years
		tons	tons	$	$	$	$
1	Brome	1·19	1·36	14 28	11 43	2 85	10 90

Rotation "Brome" was designed to furnish information about the returns from a hay farm seeded to brome.

This rotation produced an average yield per acre of 1·36 tons during the past four years and an average profit of $10.90 per acre during the same period.

The field appeared to be becoming somewhat sod-bound in 1926 and was rejuvenated in the following manner. The sod was ploughed about five inches deep immediately after harvest. It was then packed and disked and harrowed until a level seed bed was formed, after which no further cultivation was given. That this method of rejuvenation was successful is indicated by the yield of 1·19 tons of hay in 1927. Since the stand of brome was a little thin in 1927, it is expected that a still better crop will be harvested during the coming year.

ROTATION "ALFALFA"—CONTINUOUSLY—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Rotation year	Crop	Yield per acre		Value of crop 1927	Cost of production 1927	Profit per acre	
		1927	Average 5 years			1927	Average 5 years
		tons	tons	$	$	$	$
1	Alfalfa	2·01	1·76	30·15	11 02	19 13	13 87

Rotation "Alfalfa" was designed to ascertain the profits possible from growing alfalfa exclusively.

This rotation produced a profit of $19.13 in 1927 and an average profit per acre of $13.87 during the past five years. It is one of the most profitable rotations under test at the Station. It is interesting to note that after being cut continuously for five consecutive years, this field of alfalfa is still producing two tons to the acre. Some grasses are creeping into spots of the field but there still is a fair stand of alfalfa. Where an exclusive hay farm is being operated, the writer does not know of a more suitable or profitable crop than alfalfa for Central Alberta.

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CULTURAL EXPERIMENTS

The present cultural experiments were inaugurated in 1922. They consist of eleven separate projects and utilize 471 plots. As the year 1922 was utilized in establishing the rotations of the different experiments, no data are available from that season's work.

In reviewing these experiments the reader should keep in mind that these experiments were conducted on a friable or sandy loam and that the annual precipitation at this Station is 18·03 inches. Had these experiments been conducted on different soil or under different climatic conditions results might be different.

SUMMER-FALLOW TREATMENT

This experiment was designed to ascertain the effect of different methods of cultivating the summer-fallow on yield, weed control and other factors incidental to crop production. The following three-year rotation has been followed: First year, summer-fallow; second year, wheat, fall plough for oats; third year, oats. Plots 1, 3, 7 and 11 are checks. As the summer-fallow treatment might be reflected in the second crop following the summer-fallow, the data of this crop are also presented in tabular form.

SUMMER-FALLOW TREATMENT FOR WHEAT

Plot No.	Plot treatment	Yield per acre	
		Yield 1927	Average yield 5 years
		bush.	bush.
1	Plough 6 inches deep June 15, cultivate as necessary	28·7	24·8
2	Plough 6 inches deep May 15, cultivate as necessary	33·3	27·7
3	Plough 6 inches deep June 15, cultivate as necessary	36·3	28·8
4	Plough 6 inches deep July 15, cultivate as necessary	39·6	28·9
5	Plough 6 inches deep June 15, and September 15, cultivate as necessary	44·2	29·8
6	Cultivate after harvest and plough 6 inches deep June 15, cultivate as necessary	45·8	31·6
7	Plough 6 inches deep June 15, cultivate as necessary	40·8	31·5
8	Fall plough 4 inches deep after harvest and plough 6 inches deep June 15; cultivate as necessary	39·2	30·7
9	Disk after harvest and cultivate throughout summer-fallow year (do not plough)	30·0	29·7
10	Cultivate throughout summer-fallow year. This plot is not ploughed at any time during the progression of experiment	42·5	32·4
11	Plough 6 inches deep June 15, cultivate as necessary	46·3	33·9

OATS FOLLOWING SUMMER-FALLOW TREATMENT FOR WHEAT

Plot No.	Plot treatment	Yield of oats per acre	
		Yield 1927	Average yield 5 years
		bush.	bush.
1	Plough May 4, harrow and pack May 5	82·4	50·4
2	Plough May 4, harrow and pack May 5	78·0	54·9
3	Plough May 4, harrow and pack May 5	82·4	53·2
4	Plough May 4, harrow and pack May 5	76·4	56·8
5	Plough May 4, harrow and pack May 5	80·9	55·2
6	Plough May 4, harrow and pack May 5	86·7	59·1
7	Plough May 4, harrow and pack May 5	89·7	61·5
8	Plough May 4, harrow and pack May 5	83·8	61·6
9	Plough May 4, harrow and pack May 5	79·4	63·4
10	This plot is cultivated and not ploughed	82·4	65·4
11	Plough May 4, harrow and pack May 5	82·4	69·6

It will be noted that there is not a very significant difference in the yield of wheat per acre grown on land summer-fallowed in different ways. The check plots indicate a gradual increase in the productivity of the soil as it progresses from plot 1 to 11. While there is a difference in the yields produced in 1927 the five-year average smooths out the differences and indicates that these differences may be largely due to experimental error.

As a possible explanation of the similarity of the five-year averages it should be kept in mind that a considerable portion of the seasonal precipitation during the five years the experiment was conducted occurred after the usual season for ploughing the summer-fallow, hence any method of cultivation which kept the weeds in check gave satisfactory results. It should also be borne in mind that the land on which the experiment was conducted is a sandy loam and was quite friable. It is quite possible that results would have been slightly different on heavier soils.

The weed problem is also worthy of consideration when reviewing this experiment. Plot 10 on which no ploughing is done does not have grasses or perennial weeds with creeping root stalks controlled as effectively as plots on which ploughing is practised. The experience gained in conducting this experiment indicates that it is possible to grow wheat on the lighter types of soil without ploughing but that it is necessary to plough at intervals. The frequency of necessary ploughings will be governed by the kind of weeds to be controlled and the seriousness of the weed infestation.

SUMMER-FALLOW SUBSTITUTES

The object of this experiment is to study the effect of different intertilled crops as compared with the bare fallow on the production of wheat. A three-year rotation of summer-fallow or summer-fallow substitutes, wheat, and wheat, is followed in this experiment. The yield of the summer-fallow substitutes as well as the two succeeding wheat crops is presented in tabular form.

YIELD OF SUMMER-FALLOW SUBSTITUTES AND SUCCEEDING WHEAT CROPS

Plot No.	Plot treatment	Summer-fallow substitute		Wheat, 1st crop, yield per acre		Wheat, 2nd crop, yield per acre	
		1927	6 year average	1927	5-year average	1927	5-year average
		tons	tons	bush.	bush.	bush.	bush.
1	Summer-fallow	.....	.....	34·2	27·6	14·2	20·7
2	Corn	6·5	10·0	29·2	24·9	19·2	20·9
3	Sunflowers	11·3	16·5	25·8	27·3	18·3	20·1
4	Oat green-feed	6·2	6·1	24·2	24·3	14·6	18·8
5	Summer-fallow	.....	.....	15·0	23·6	11·7	19·6
		bush.	bush.				
6	Oats (3 bush. per acre)	39·0	42·4	5·0	16·6	12·9	16·8
7	Oats (1½ bush. per acre)	40·5	39·0	5·8	16·5	16·7	16·7
8	Summer-fallow	.....	.....	9·2	24·0	17·9	19·5
9	Oats, 2 drills alternating with 36 inches intertilled space	67·6	42·7	8·3	19·6	20·4	18·4
10	Oats, 3 drills, alternating with 36 inches intertilled space	57·4	45·2	12·5	22·0	20·8	20·1
11	Summer-fallow	.....	.....	22·5	24·8	16·7	21·6
12	Oats, 4 drills, alternating with 36 inches intertilled space	60·3	42·0	14·6	20·8	22·9	19·1
13	Oats, 5 drills, alternating with 36 inches intertilled space	61·8	43·2	12·9	19·8	19·2	18·3
14	Summer-fallow	.....	.....	29·2	28·2	20·8	22·7
		tons					
15	Corn and oats	10·9	.....	27·9	.....	20·8	*
16	Sunflowers and oats	13·8	.....	27·1	.....	18·8	*

* Only one year's results available.

In considering the merits of the different summer-fallow substitutes it is interesting to note that none of the summer-fallow substitutes have produced yields equal to the bare fallow. It will be noted that the influence of this method is manifest in the second year wheat following the treatment.

Corn and sunflowers have produced excellent results as summer-fallow substitutes and have been superior to other crops tested in this respect. Like other intertilled crops, however, they are not effective in controlling weeds with creeping root stalks such as sweet and couch grasses.

Oat greenfeed has produced surprisingly good results as a summer-fallow substitute. Experience with this crop teaches that oat greenfeed when grown on well prepared land and harvested in the early dough stage is a better cleaning crop than a poorly cared for intertilled crop.

The practice of growing cereals in drills as a grain crop has little to recommend it in central Alberta. Grain in multiple rows is neither a good cleaning crop nor a good preparation for the succeeding grain crop. Oats, when grown in this manner, make a better summer-fallow substitute crop if ensiled when in the early dough stage so that no mature grain will shatter and pollute the succeeding grain crop. Using the crop while immature for silage also removes most of the weed seeds growing in the crop before they have fully matured.

STUBBLE TREATMENT

This experiment was designed to ascertain the most satisfactory method of treatment of wheat stubble in preparation for wheat and oats. A three-year rotation of summer-fallow, wheat, and wheat and oats, is followed. The summer-fallow is given uniform treatment, the variation in cultural methods occurring in the preparation of the wheat stubble for wheat and oats.

WHEAT STUBBLE TREATMENT IN PREPARATION FOR WHEAT

Plot No.	Plot treatment	Yield per acre	
		Yield, 1927	Average yield 5 years
		bush.	bush.
1	Plough in autumn	41·7	29·7
2	Plough in spring	38·3	25·3
3	Disk stubble in spring and seed	44·2	28·7
4	Plough in autumn	40·0	28·2
5	Burn stubble in spring, plough and seed	32·0	27·5
6	Burn stubble in spring, disk and seed	25·8	21·9
7	Plough in autumn	38·3	22·0

WHEAT STUBBLE TREATMENT IN PREPARATION FOR OATS

8	Plough in autumn	83·8	54·4
9	Plough in spring	50·0	46·3
10	Burn stubble in spring, disk and seed	39·4	36·8
11	Plough in autumn	82·4	53·5

In the preparation of wheat stubble for wheat, plots 1, 4 and 7 are checks. The 1927 results indicate that stubble burning followed by disking and seeding is the least satisfactory of the different treatments, with the effect of stubble burning less pronounced where the stubble burning is followed by spring ploughing. These results are also borne out, though in a less marked degree, by the five-year average. The results produced by disking in the crop on stubble are really better than one would anticipate. It should be borne in mind, however, that the experiment was conducted on a friable loam and such good returns might not be obtained on the heavier types of soils.

Spring ploughing for both wheat and oats was not nearly as productive as fall ploughing during the past five years. It would seem that farmers would be well advised to do all the fall ploughing possible.

Stubble burning appeared to be even less satisfactory for oats than for wheat, both in 1927 and during the five-year average. It would therefore seem wise to incorporate the crop residue in the soil unless it is so abundant that it prevents the proper operation of tillage implements.

BARNYARD MANURE FOR WHEAT

This experiment was designed to study the effect of different manurial treatments on the growth and development of wheat. A three-year rotation of summer-fallow, wheat and wheat is followed. The manurial treatments are given for both the first and second year wheat following summer-fallow. The treatment and yields produced are given in the accompanying table:—

BARNYARD MANURE FOR WHEAT—RESULTS OF TEST

First Year Wheat following Summer-Fallow

Plot No.	Plot treatment	Yield per acre	
		Yield 1927	Average yield 5 years
		bush.	bush.
1	Summer-fallow	25·0	21·2
2	Summer-fallow—top dressed with 10 tons rotted manure before ploughing	31·2	24·2
3	Summer-fallow	31·7	24·9
4	Summer-fallow—straw returned to land before ploughing	30·0	23·6
5	Summer-fallow	21·3	22·3
6	Summer-fallow	35·9	29·7
7	Summer-fallow	34·2	27·4
8	Summer-fallow	36·7	28·4

Second Year Wheat following Summer-Fallow

1	Stubble—no manure, fall ploughed	14·2	16·2
2	Stubble—no manure, fall ploughed	18·7	21·7
3	Stubble—top dressed with 10 tons rotted manure and fall ploughed	29·2	23·7
4	Stubble—straw returned to plot and fall ploughed	12·5	18·0
5	Stubble—no manure, fall ploughed	17·5	16·2
6	Stubble—fall ploughed, wheat top dressed with 10 tons rotted manure when 3 inches high	19·2	18·2
7	Stubble—top dressed with 10 tons unrotted manure and fall ploughed	17·9	20·7
8	Stubble—no manure, fall ploughed	21·8	19·0

AVERAGE OF FIRST AND SECOND YEAR WHEAT FOLLOWING SUMMER-FALLOW

Plot No.	Plot treatment	Average yield per acre
		bush.
1	Check	18·7
2	Treated as outlined	22·9
3	Treated as outlined	24·3
4	Treated as outlined	20·8
5	Check	19·3
6	Treated as outlined	23·9
7	Treated as outlined	24·1
8	Check	25·4

The average of the first and second year wheats following summer-fallow give the full effect of the manurial treatment on yield.

Where the full rotation is considered, it will be seen that manurial treatment in any form resulted in an increased yield per acre. On the other hand, it is doubtful if the increased yield per acre as the result of manure is sufficient to pay for the cost of applying the manure. Nevertheless the application of barnyard manure or straw in any form is recommended where it can be done without additional outlay such as when teams would otherwise be idle. It is believed that it would be a much wiser policy to maintain the fertility and proper texture of the soil by the application of barnyard manure during slack times in the season than to allow the land to become depleted of its organic matter and then endeavour to build it up again.

It is interesting to note the effect of returning the straw to the land. This practice increased the yield per acre in the crop following summer-fallow but lowered the yield when ploughed under in the fall for the crop the succeeding year. The average of the first and second crop following summer-fallow shows an increase in the yield per acre in favour of this practice.

It is doubtful if the practice of top dressing wheat when it is about 4 inches high can be recommended as driving over the crop at this stage with a manure spreader will seriously damage a large percentage of plants, while spreading the manure by hand from a wagon is of even more doubtful value as the manure would tend to be left on the land in chunks and thus smother any wheat covered.

BARNYARD MANURE FOR SUNFLOWERS

This experiment is designed to study the effect of different manurial treatments on the yield and maturity of sunflowers. Four years' results are now available and indicate that the application of barnyard manure tends to increase the yield of sunflowers but not in sufficient quantity to make it profitable. Summer-fallowing the land to be seeded with sunflowers is not advisable as the resulting increase in yield does not compensate for the loss of crop and expense of summer-fallowing. It is to be expected that as land becomes older with more of its organic matter exhausted, that the application of fertilizers will give greater returns.

BARNYARD MANURE FOR POTATOES

The application of barnyard manure for potatoes is of very doubtful value on most of the rich black soils of central Alberta. While there is a slight increase in yield as a result of the use of manure the yields produced by unmanured land are so large and so nearly equal to that produced on manured land that increases resulting from the use of fertilizer appear insignificant. There is also the possibility that the addition of barnyard manure tends to develop additional vines instead of tubers and also to lengthen the growing season of the crop, which is a disadvantage in our comparatively short growing season.

GREEN MANURE CROPS

The object of this experiment is to study the effect of the different green manure crops on the yield and maturity of oats. The results to date indicate that green manure crops when ploughed down do not produce as good yields as the summer-fallow. Apparently the organic matter returned to the soil in the form of green manure does not compensate for the loss of soil moisture and plant food utilized by the growing green manure crops. It would seem as though moisture were a greater limiting factor in crop production than fertility on the land used in this experiment.

RATES OF SEEDING GRASSES AND LEGUMES

The object of this experiment is to determine the rate of seeding that will give the most satisfactory returns for the different grasses and clovers commonly grown in this district. A four-year rotation of summer-fallow, wheat seeded down, hay and hay is followed. The yields produced by the different rates of seeding are given in the table presenting the data of the experiment.

RATES OF SEEDING GRASSES AND LEGUMES—RESULTS OF TESTS

Plot No.	Crop and rate of seeding	Yield per acre	
		Yield 1927	Average yield 3 years
		tons	tons
1	Western rye, 5 pounds per acre	0·62	0·92
2	Western rye, 10 pounds per acre	0·5	1·09
3	Western rye, 15 pounds per acre	0·54	1·05
4	Timothy, 2 pounds per acre	1·98	1·61
5	Timothy, 5 pounds per acre	1·37	1·21
6	Timothy, 10 pounds per acre	0·85	1·23
7	Alfalfa, 5 pounds per acre	1·78	1·78
8	Alfalfa, 10 pounds per acre	1·76	1·83
9	Alfalfa, 15 pounds per acre	1·90	1·83
10	Sweet clover, 5 pounds per acre	1·52	1·81
11	Sweet clover, 10 pounds per acre	2·03	1·93
12	Sweet clover, 15 pounds per acre	2·45	2·30
13	Brome, 5 pounds per acre	0·62	0·94
14	Brome, 10 pounds per acre	0·62	1·15
15	Brome, 15 pounds per acre	0·91	1·29

The season of 1927 was ideal for most hay crops, but for some reason the western rye grass made a very poor showing. It is rather interesting to note that during the dryer years the rye grass made a heavier growth than timothy, while the reverse was the case last season when there was an abundance of moisture available during the growing season. In addition to this, the timothy developed a heavy second growth in 1927, while the rye grass did not develop any aftermath at all.

The yields produced by the different rates of seeding indicate 10 to 15 pounds per acre as the most satisfactory rate of seeding western rye grass. As indicated in the foregoing paragraph, the 1927 results of this experiment gave little information as a result of a very poor development of the rye grass plants in all the rates of seeding. In fact the rye grass plants lacked sufficient vigour to compete with the dandelions and other weeds which grew in the plot, hence the similarity of yields.

The yields of timothy produced in 1927, a year when timothy made an optimum growth, more or less contradict the results obtained in drier seasons. The thinner seeding gave the heaviest yields in 1927, while the thicker seeding gave heavier yields in dryer seasons.

There appears to be little advantage in seeding more than 10 pounds of alfalfa per acre. Thinner seedings than this, while fairly productive, produce far too many weeds in the hay crop, which is also too coarse to provide maximum palatability.

The heaviest seeding of sweet clover has always produced the heaviest, finest and most palatable hay crop. The 10-pound seedings gave a heavy crop of rather coarse hay, while the 5-pound seedings are far too thin, producing a very weedy crop of very coarse hay.

Ten pounds of brome seed per acre appears to be very satisfactory. In the 5-pound seeding the stand is rather thin the first year, resulting in a coarse,

weedy crop of hay. This seeding, however, usually thickens up sufficiently to give a good stand by the second season, while the 15-pound per acre seeding thickens up quickly and would make excellent pasture sod, but tends to become sod-bound quickly if left for hay.

METHODS OF SEEDING TO GRASS AND LEGUMES

This experiment was designed to furnish information relative to the most effective method of seeding to grass and legumes. A five-year rotation with different crop sequences is followed. The essential points of this experiment are given in the table relating to the experiment. A mixture of western rye, 8 pounds, and alfafa, 6 pounds, is seeded on plots 1 to 8; while sweet clover at the rate of 10 pounds per acre is seeded on plots 9, 10, and 11.

METHODS OF SEEDING TO GRASS AND LEGUMES—RESULTS OF TEST

Plot No.	Plot treatment	Yield per acre	
		Yield 1927	Average yield 3 years
		tons	tons
1	Seeded with first year wheat after fallow	1·34	1·73
2	Seeded with first year oats after fallow	2·75	2·06
3	Seeded with second year oats after fallow	1·77	1·61
4	Seeded with first year wheat after fallow	2·37	1·99
5	Seeded alone after first year oats	3·26	2·24
6	Seeded early in spring on fall rye	2·65	2·04
7	Seeded with first year barley after fallow	2·34	2·15
8	Seeded with first year wheat after fallow	1·95	1·86
9	Seeded with second year wheat after fallow	1·61	1·75
10	Seeded alone after first year wheat	2·16	2·26
11	Seeded in early spring on fall rye	2·02	1·97
12	Seeded with second year wheat after fallow	1·75	1·74

This experiment has been under way for five years, but only three years' results are available for the reason that during two of the five years the stand of hay was so imperfect and contained so many weeds that it was considered any yields recorded would not be comparable. The experience gained with this experiment indicates that there are certain years when a combination of climatic and soil conditions make it practically impossible to get a good stand of grass or legumes even when the most approved methods of obtaining a stand are followed, while, on the other hand, there are certain years when almost any method of seeding will give excellent stands. Conditions were favourable in 1926 and 1927, when there was little difference between yields produced by different treatments.

The three-year average results indicate that seeding without a nurse crop will give a heavier crop of hay than where a nurse crop is used. It is doubtful, however, if the increase in yield resulting from seeding without the nurse crop compensates for the loss of the nurse crop. It is also doubtful if seeding down without a nurse crop gives any greater assurance of a good stand since most of the land under cultivation contains so many weed seeds that a heavy weed growth develops where the nurse crop is omitted.

Seeding on spring-ploughed stubble land seems less satisfactory than any other method. Spring ploughing makes the land very loose and, if the season is dry, the land is usually so loose that the seed is buried too deeply or else falls in loose dry soil and does not germinate. If there is sufficient moisture in the soil thorough packing will firm spring-ploughed soil sufficiently to bring the soil moisture near the surface and cause the fine grass and legume seeds to germinate if not seeded too deep.

The yields reported do not indicate the value of fall rye as a nurse crop. Fall rye appears to be a safe nurse crop in a year with normal precipitation. As a rule, however, the grass and legume plants growing among fall rye lack considerably in vigour as compared with those grown with other nurse crops, while the hay produced the following year usually contains considerable dead stubble as well as volunteer rye, making this hay the least attractive of the lot.

Results indicate little difference between wheat, oats, and barley as nurse crops. Observations, however, would indicate that wheat, barley, and oats are preferable in the order named.

A rather remarkable factor was manifest in 1927 where sweet clover was seeded with wheat as a nurse crop. The sweet clover made an unusually vigorous growth, with the result that it was almost as tall as the wheat in many cases. It is reasonable to presume that such a rank growth would materially reduce the yield of wheat and tend to retard the drying process in the stook.

BREAKING SOD FROM CULTIVATED GRASSES

The object of this experiment is to gain information concerning the most satisfactory method to follow in breaking sod from cultivated grasses in preparing the land for cereals. Brome grass, when well established, is as difficult to eradicate as couch grass, while timothy frequently produces so much volunteer growth in wet seasons following breaking that yields are materially affected. In this experiment a five-year rotation of oats, oats, grass seed sown without a nurse crop, hay, and hay is followed. Plots 1 to 7 are seeded with a mixture of western rye grass, 8 pounds, and timothy, 2 pounds per acre, while plots 8, 9, and 10 are seeded with 10 pounds of brome grass per acre. The yields and treatments are given in the table relating to the experiment.

BREAKING SOD FROM CULTIVATED GRASSES—RESULTS OF TEST

Plot No.	Plot treatment of sod	Yield per acre	
		Yield 1927	Average yield 5 years
		bush.	bush.
1	Rye and timothy sod ploughed 5 inches deep after crop is removed, work as required	76·5	39·4
2	Rye and timothy sod ploughed 5 inches deep in October	54·4	41·8
3	Rye and timothy sod ploughed 5 inches deep in spring, disk and seed at once	57·4	34·7
4	Rye and timothy sod ploughed 5 inches deep after crop is removed, work as required	64·7	38·2
5	Rye and timothy sod ploughed 5 inches deep after crop is removed, disk and backset September 15	51·5	34·5
6	Rye and timothy sod ploughed 5 inches deep May 15, work as summer-fallow	52·9	33·8
7	Rye and timothy sod ploughed 5 inches deep after crop is removed, work as required	61·8	38·8
8	Brome grass sod ploughed 5 inches deep after crop is removed, work as required	45·6	41·5
9	Brome grass sod ploughed 5 inches deep after crop is removed, disk and backset September 15	51·5	39·1
10	Brome grass sod ploughed 5 inches deep after crop is removed, work as required	50·0	38·4

The second crop of grain following breaking is usually much freer from grass than the first crop.

The control of brome grass is a serious problem. In fact brome grass is so hard to eradicate that the writer hesitates to recommend it except where it is the intention to leave the land permanently in sod. Where brome grass sod is being prepared for cultivation, the most effective way is to plough shallow as soon as the hay crop is removed, keep thoroughly worked during the remainder of the season, and backset 6 to 8 inches deep late in the fall. If the season is dry and favourabe for the eradication of grass with creeping root stalks, this

treatment will give good results. On the other hand, if there is much rainfall during the season it is next to impossible to eradicate this grass. The five-years' average yields show no advantage in favour of backsetting, although there was much less brome grass in plots of oats grown on backsetting.

In reviewing this experiment it should be borne in mind that the seasonal rainfall appears to influence the results to a marked degree. Since part of the results were obtained in wet years and part in dry years, the five-year averages appear to have partially neutralized the effect of cultural methods for the five years in question.

The results produced by this experiment in 1927 indicate that ploughing the rye grass and timothy sod as soon as the crop was removed and working the land as a fallow during the remainder of the season produced good yields and kept the land reasonably free from volunteer timothy. In districts with precipitation similar to that which occurred at Lacombe in 1926-27 the foregoing method will in all probability meet with most favour since it gives a crop of hay and leaves the land in good condition for a crop the following year.

The late fall-ploughed sod gives surprisingly good results, as does the land ploughed and seeded at once. Neither of the two practices can be recommended except for moist districts as such treatments would practically insure crop failure in drier areas.

Ploughing in May and working as a fallow throughout the season is very effective in controlling volunteer grass, but has not given as good yields as might be expected. In all probability this method would give better comparative results in drier districts or drier years.

Ploughing after the crop is removed and backsetting in September does not effectively control timothy in moist seasons. As a rule a large number of timothy plants are still living when the sod is returned to its original position by backsetting. The result is that more volunteer timothy developed in the crop of grain grown on land that was backset than on land following any other treatment.

PLACE IN ROTATION TO SEED WINTER RYE

This experiment was designed to study the effect of seeding fall rye in combination with and following other crops as compared with seeding in the regular way. The method of seeding and yields produced are presented in tabular form.

PLACE IN ROTATION TO SEED WINTER RYE—RESULTS OF TEST

Plot No.	Plot treatment	First year of rotation, miscellaneous crops		Second year of rotation fall rye	
		Yield 1927	Average yield 5 years	Yield 1927	Average yield 5 years
		bush.	bush.	bush.	bush.
1	Summer-fallow, fall rye seeded August 15	.....	.....	29·0	22·5
2	Wheat, fall rye seeded with wheat in spring	23·3	19·9	11·6	16·2
3	Wheat, fall rye seeded on disked wheat stubble	33·3	27·2	24·1	16·5
4	Barley, fall rye seeded with barley in spring	20·0	20·0	10·7	11·9
5	Summer-fallow fall rye seeded August 15	.....	.....	28·6	23·1
6	Barley, fall rye seeded on disked barley stubble	24·0	24·1	17·4	18·3
7	Barley, fall rye seeded on fall-ploughed barley stubble	21·9	27·6	14·7	18·0
8	Oats, fall rye seeded with oats in spring	40·4	41·8	6·7	13·8
9	Summer-fallow, fall rye seeded August 15	.....	.....	24·6	23·1
10	Oats, fall rye seeded on disked oat stubble	41·9	65·7	15·2	16·0
11	Oat greenfeed, fall rye seeded with oats at seeding	2·1	2·4	8·5	15·6
12	Sunflowers, fall rye seeded immediately after harvest	11·0	19·0	21·5	22·2
13	Summer-fallow, fall rye seeded August 15	.....	.....	20·0	23·6
14	Oat greenfeed, fall rye seeded when oats are about 4 inches high	2·8	2·5	18·9	18·1
15	Western rye, sod ploughed after hay is removed and fall rye seeded	.....	.....	13·4	13·4

It will be noted that in both the 1927 and five-year average yields the summer-fallow produced the largest yields per acre. This does not necessarily mean that these yields would be most profitable since it is doubtful if the increased yields of fall rye per acre on summer-fallow compensate for the loss of crop during the summer-fallow year. Some of the crops work in better with fall rye than others.

Wheat is not a good preparatory crop for fall rye. When fall rye is seeded with wheat in the spring it frequently heads out, thus acting as a weed in polluting the grain produced as well as materially reducing the yield. Our season is too short to permit stubbling in fall rye on wheat stubble unless arrangements could be made to have the seed drill follow the binder.

The statements with respect to wheat hold good for barley as well. While barley if seeded early in the spring would be harvested in time to stubble in fall rye, barley is usually the last cereal seeded and as a result is seldom ready for harvest before wheat; hence in Central Alberta barley is not any more satisfactory as a preparatory crop than wheat. It has been found that fall rye usually does better on disked stubble than on fall ploughed stubble, since fall ploughing tends to dissipate the surface moisture leaving a loose dry seed bed, while disking makes a fine moist seed bed with a firm bottom which as a rule gives a quick, uniform germination of fall rye. The latter point is very important where fall rye is seeded very late in the season; which is always the case where fall rye follows a spring-seeded cereal.

Like wheat and barley, oats for grain is not a satisfactory preparatory crop for fall rye, for the reason that our season is too short to permit the crop being harvested in time. Where the oats are to be used as greenfeed, however, such is not the case, since fall rye can be rotated to advantage with this crop. In addition to the two methods outlined in this experiment another method is followed in a rotation experiment conducted under field conditions. This latter method is most satisfactory. In this method the oats are cut when in the dough stage and ensiled and the stubble immediately disked and fall rye seeded. The oats are usually ready to ensile before September 1, hence the fall rye is seeded early enough to make a substantial growth before winter sets in.

Sunflowers have proven an excellent preparatory crop for fall rye. Since they would also be considered a fair to good preparatory crop for wheat, it is doubtful if they will come into general use as a preparatory crop for fall rye, a less profitable crop.

Fall rye does not do well when seeded on rye grass sod ploughed after the hay crop is removed. There appears to be neither sufficient moisture or fertility available to develop a normal crop.

DATES OF SEEDING WINTER RYE

The object of this experiment is to determine the date of seeding fall rye that will result in the largest yields per acre. A three-year rotation of summer-fallow, fall rye and oats is followed. The date of seeding and yields are presented in tabular form.

DATES OF SEEDING WINTER RYE—RESULTS OF TEST

Plot No.	Date of seeding	Yield per acre	
		Yield 1927	Average yield 5 years
		bush.	bush.
1	Seeded August 15	20·1	21·2
2	Seeded July 1	25·0	17·9
3	Seeded July 15	26·3	22·4
4	Seeded August 1	33·5	26·7
5	Seeded August 15	25·1	23·9
6	Seeded September 1	27·2	30·7
7	Seeded September 15	20·5	28·6
8	Seeded October 1	19·6	17·4
9	Seeded August 15	32·6	25·3

The yields produced in this experiment in 1927 indicate that the date of seeding has little or no influence on the yield of fall rye. The winter of 1926-27 was very favourable for all winter crops, practically no winter killing occurring. The five-year average is therefore a safer criterion of what one may expect under normal conditions. The five-year average results indicate that the best time to seed fall rye is between August 1 and September 15.

DATES OF SEEDING CORN AND SUNFLOWERS

The object of this experiment is to determine the date on which sunflowers and corn should be planted to obtain best results. A three-year rotation of sunflowers or corn, wheat and oats is followed. The dates of seeding and yields produced are presented in the accompanying table.

DATES OF SEEDING CORN AND SUNFLOWERS

Plot No.	Plot Treatment	Yield per acre	
		Yield 1927	Average yield 6 years
		tons	tons
1	Corn seeded May 6	7·5	8·4
2	Corn seeded May 13	5·6	8·4
3	Corn seeded May 20	8·3	9·9
4	Corn seeded May 27	5·3	9·9
5	Corn seeded June 6	6·5	9·8
6	Corn seeded June 11	6·2	9·9
1	Sunflowers seeded May 6	5·7	15·9
2	Sunflowers seeded May 13	7·5	15·8
3	Sunflowers seeded May 20	8·6	14·7
4	Sunflowers seeded May 27	7·4	13·7
5	Sunflowers seeded June 6	6·7	15·2
6	Sunflowers seeded June 27	6·0	13·5

The results of this experiment indicate that corn should not be seeded before the third week of May, while it would seem that the earlier sunflowers are seeded the higher the yields will be. Sunflowers are not very subject to frost injury, hence will stand seeding earlier in the spring than corn which is very susceptible to frost injury. The varieties of sunflowers usually grown for silage require a longer growing period than the varieties of corn grown for silage.

CEREALS

The season of 1927 was one of the best in the history of the Station for early maturing varieties of cereals. The crops were seeded under ideal conditions and made a normal growth until the latter part of August when cool weather started and tended to retard the maturing process of unripened varieties. The result was that all medium to late maturing sorts suffered more or less frost injury while early maturing sorts proved their suitability for existing conditions.

VARIETY TESTS WITH SPRING WHEAT

The wheats included in this experiment were seeded on May 10, in duplicate one-fortieth-acre plots. The land was well summer-fallowed the previous season. The yields and other data are presented in the tables relating to this phase of the cereal work.

VARIETY TESTS WITH WHEAT—RESULTS IN 1927

Name of Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of ten points	Weight per measured bushel after cleaning	Actual yield of grain per acre
			in.		lb.	bush.
Ceres	Sept. 7	120	44	5	61	35·0
Crown Ottawa 353	" 1	114	44	8½	62	40·5
Duchess Ottawa 933	Aug. 30	112	45	8	64	35·0
Early Red Fife Ottawa 18	Sept. 18	131	51	9	51	40·0
Early Triumph	" 18	131	53	9	59	47·5
Garnet Ottawa 652	" 2	115	43	8	63	48·0
Huron Ottawa 3	" 16	129	55	9	59	45·0
Kota	" 14	127	48	5	59	31·0
Kitchener	" 16	129	55	9	57	46·0
Major Ottawa 522	" 9	122	48	8½	62	43·5
Marquis Ottawa 15	" 14	127	50	9	61	40·5
Marquis 10 B	" 14	127	50	9	61	43·5
Master Ottawa 520	Aug. 30	112	46	8	62	33·0
Pioneer	Sept. 4	117	46	7	63	32·5
Producer Ottawa 197	" 10	123	49	7	61	46·5
Prelude Ottawa 135	Aug. 30	112	48	7½	63	32·5
Quality	Sept. 11	124	44	8½	62	49·5
Red Bobs 222	" 9	122	48	8½	62	45·0
Renfrew U. of A	" 20	133	52	9	56·5	37·5
Reward Ottawa 928	" 8	121	46	8	64	41·0
Ruby Ottawa 628	" 1	114	46	7½	61·5	40·5
Supreme	" 11	124	40	9	61	53·5

WHEAT, THREE, FOUR AND FIVE YEAR AVERAGES

Variety	Three-year Average		Four-year Average		Five-year Average	
	Days to mature	Yield per acre	Days to mature	Yield per acre	Days to mature	Yield per acre
		bush.		bush.		bush.
Crown Ottawa 353	108	38·5	112	42·5	113	36·5
Duchess Ottawa 933	107	38·5	111	43·0	112	38·0
Early Red Fife Ottawa 18	122	42·0	124	44·0	125	39·5
Early Triumph	119	44·0	121	48·5	122	43·5
Garnet Ottawa 652	108	46·0	112	50·0	112	42·5
Huron Ottawa 3	117	45·0	120	47·5	121	42·0
Kitchener	121	52·5	123	54·0	125	49·0
Kota	119	41·0	.....	.....	.....	.....
Major Ottawa 522	115	45·0	117	45·0	119	41·0
Marquis Ottawa 15	121	47·5	122	50·0	123	45·0
Marquis 10 B	120	46·0	121	48·0	.....	.....
Master Ottawa 520	108	34·5	110	39·0	112	34·5
Pioneer	112	39·0	.....	.....	.....	.....
Producer Ottawa 197	117	50·0	119	52·0	120	45·5
Prelude Ottawa 135	106	36·5	109	37·0	110	32·0
Red Bobs 222	114	49·0	.....	.....	.....	.....
Renfrew	124	44·0	.....	.....	.....	.....
Reward Ottawa 928	113	40·5	115	42·0	116	37·5
Ruby Ottawa 623	109	36·5	112	39·0	113	34·5
Supreme	116	50·5	119	53·5	121	47·5

One year's experiments might give somewhat misleading impressions as to the relative value of the different varieties, hence the three, four and five-year averages are also given. Varieties mentioned in the 1927 report and not listed in the averages have been grown in the variety tests for less than three years.

A feature of the variety test not included in the tabular report is the suitability of the different varieties to the district. Experience has shown that the heaviest yielding sorts of wheat are not always the best varieties to grow. Frequently the late maturing sorts such as Renfrew and Early Red Fife Ottawa 18 are so late maturing that the grain produced takes such a low grade that it has little more value per pound than oats or barley. Where such is the case, grain growers naturally turn to the production of the coarser grains. A second group of varieties which includes Marquis, Huron, Red Bobs and varieties of similar maturity frequently escape frost injury but cannot be considered really safe varieties to grow on fallow or new breaking in the park belt of the province. The third or early maturing group which includes varieties with maturity similar to Garnet and Reward are much safer varieties from the standpoint of maturity.

Marquis Ottawa 15 wheat needs no introduction. It is doubtful if a better wheat can be found for most districts where it will mature. While numerous varieties will produce higher yields under certain conditions there is no other variety which combines the desirable characteristics of a good wheat to the same extent as Marquis. Varieties which are an improvement over Marquis in one respect usually sacrifice some other desirable character. Growers who are farming in districts where Marquis matures and where it is not affected with rust would be well advised to continue growing this variety as commercial grain.

Garnet Ottawa 652 wheat has proven its suitability on many farms of the park belt of Central Alberta during the past season. In most cases it has graded from one to three grades higher than the other variety the farmer was growing. In addition to this, reports indicate that the yield frequently exceeded that produced by the other sort. It produced such satisfactory results that most farmers who grew it in 1927 have decided to grow nothing else in 1928. The only criticisms the producers have voiced have been that the variety shatters to a slight extent and the straw is not quite as strong as some sorts, although

none reported the variety seriously lacking in either respect. Samples of threshed grain submitted to the Station showed that Garnet produced few, if any, starchy kernels where other varieties sometimes produced as high as 50 per cent piebald, or starchy kernels.

The early maturing selections of Red Bobs, namely Supreme, Early Triumph and Red Bobs 222, are meeting with considerable favour among wheat growers. Since these varieties lack something in quality when grown under certain conditions, they will doubtless be eventually replaced by earlier maturing sorts.

Reward Ottawa 928 wheat, is a wheat of considerable merit, producing a sample of unusual quality and weight per bushel. While it is only a fair yielder here it is anticipated that the quality of the grain may tend to compensate for any lack in yield. It would seem, in fact, as though the early maturing character of Reward, combined as it is with unusual quality, may make this variety one of the most suitable sorts for the park belt of central Alberta.

Renfrew, a new variety developed and distributed by the University of Alberta, appears to be too late maturing to be suitable for general use in the park belt of central Alberta.

Ruby Ottawa 623 is still grown in a few districts. It is not a heavy yielder, and shatters badly, and farmers who are still growing Ruby would be well advised to replace it with Garnet.

Huron and Kitchener are still grown but undoubtedly have outlived their usefulness and should be replaced by the later developed, earlier maturing sorts.

Kota and Pioneer have little to recommend them for use in central Alberta.

Prelude Ottawa 135, is still the earliest maturing variety grown in the test plots. In view of all the statements about moving the wheat belt northward, it is interesting to note that this variety still holds first place in earliness. But since Prelude is bearded, a low yielder, and shatters badly, its chief value would seem to be as a parent for the production of new early maturing sorts by hybridization.

Quality is a fairly early maturing variety. It has no place in our agriculture at present for the reason that it is not as early maturing as some of our standard sorts, and, in addition to this, has a light coloured kernel which would result in a serious cut in price when the threshed grain is placed on the market.

VARIETY TESTS WITH OATS

Eighteen varieties of oats were tested in 1927 in duplicate plots. They were seeded on May 11 on land which was well summer-fallowed the previous season. Climatic conditions which prevailed in 1927 resulted in most of the oats lodging. The earlier maturing, lower yielding varieties show to better advantage than usual because they stood up better and thus brought more of their grain to full maturity. The yields and other data are included in the accompanying table.

VARIETY TESTS WITH OATS

Name of Variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of ten points	Weight per measured bushel after cleaning	Actual yield of grain per acre
			in.		lb.	bush.
Abundance	Sept. 2	114	58	6	40	67·7
Alaska	Aug. 17	98	52	8	38	72·8
Banner Ottawa 49	Sept. 2	114	60	7	42	66·6
Banner, Sask	" 2	114	59	7	40	67·7
Banner, Waugh	" 2	114	61	7	40	67·3
Banner, Dixon	" 4	116	64	5	37	38·3
Banner, McDonald	" 1	113	60	7	41	75·8
Banner, Dow	" 2	114	61	7	41	72·4
Daubeney, Ottawa 47	Aug. 19	100	44	8	36	80·0
Gold Rain	" 30	111	56	8	40	73·5
Irish Victor	Sept. 2	114	62	6	39	72·4
Laurel Ottawa 477	Aug. 27	108	58	6	51	67·6
Leader	Sept. 4	116	60	7	37	100·0
Legacy Ottawa 678	Aug. 25	105	58	8	40	100·8
Liberty Ottawa 480	" 26	106	52	9	47	61·8
Longfellow Ottawa 478	" 27	107	56	7	37	89·4
O.A.C. No. 3	" 19	100	42	8	37	79·4
Victory	Sept. 2	114	60	7	42	89·0

OATS—THREE, FOUR AND FIVE-YEAR AVERAGES

Variety	Three-year average		Four-year average		Five-year average	
	Days to mature	Yield per acre bush.	Days to mature	Yield per acre bush.	Days to mature	Yield per acre bush.
Alaska	95	70·9	97	69·0	99	60·2
Banner Ottawa 49	122	96·1	121	96·3	120	84·6
Banner, Dow	122	90·4	122	80·0	.....	.....
Banner, Sask	124	91·7	123	92·2	122	82·6
Banner, McDonald	121	91·6	.....	.....	.....	.....
Daubeney Ottawa 47	95	76·7	97	78·5	99	60·8
Dixons	123	66·6	122	71·2	.....	.....
Gold Rain	109	82·5	110	86·1	112	79·2
Irish Victor	112	84·7	113	87·0	114	78·8
Laurel Ottawa 477	104	64·1	105	62·7	107	55·9
Leader	112	89·7	113	92·5	114	86·0
Legacy Ottawa 678	104	86·9	105	89·0	107	81·1
Liberty Ottawa 480	102	50·2	103	52·2	105	46·4
O.A.C. No 3	97	76·6	99	77·5	100	67·5
Victory	111	87·5	112	89·4	114	83·2

The three, four and five-year averages are given for most of the varieties included in the 1927 test. These averages are a truer criterion of the value of the different sorts than the 1927 results in that they indicate the productiveness of the varieties under varying conditions.

Banner Ottawa 49 or any of the different strains of Banner are considered our most satisfactory commercial oat. Banner is one of the most productive varieties under test. The straw is of fair strength and it is considered one of our best varieties to grow for the production of large tonnages of green feed. The kernel belongs to the long group and does not appear as plump as Victory, which is very similar to Banner except that it produces a plumper sample of grain and a slightly lower yield. The writer ventures the opinion that fully 90 per cent of the oats produced in central Alberta belong to these two varieties, with the honours equally divided. There is little to choose between the two varieties.

Leader is quite popular with some farmers. While it is one of the most productive sorts tested at the Station, the grain has a rather thick hull and the straw is rather coarse. It is not as satisfactory a variety to grow as either Banner or Victory.

Alaska is the best of the early maturing sorts. Where Banner or Victory are too late maturing to give satisfactory results the grower might do well to give Alaska a trial. It has a strong, fine straw and produces a kernel that is plump, well filled, thin hulled and weighs well per bushel. Since it does not produce as rank a growth of straw and matures much earlier than the late maturing varieties usually grown, it does not lodge as much as these sorts.

VARIETY TESTS WITH BARLEY

Sixteen varieties of barley were grown in 1927 in duplicate plots. They were seeded on May 14 on land that was thoroughly summer-fallowed the previous year. All the barley plots lodged badly and it is quite possible that yields would have been higher and the varieties ranked differently with respect to productivity had they matured without lodging. The yields and other data are included in the accompanying table.

VARIETY TESTS WITH BARLEY

Name of variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of ten points	Weight per measured bushel after cleaning	Actual yield of grain per acre
			in.		lb.	bush.
Barks Excelsior	Aug. 29	107	39	6	43	52·1
Bearer Ottawa 475	" 25	103	50	6	43	45·8
Canadian Thorpe	" 25	103	44	5½	50	36·2
Chinese Ottawa 60	" 20	98	46	5	47	39·6
Duckbill Ottawa 57	" 26	104	48	6	50	42·0
Feeder Ottawa 561	" 19	97	51	5	51	38·3
Fenil Ottawa 670	" 19	97	48	6	57	25·0
Gold	" 29	107	39	6	46	35·8
Himalayan Ottawa 59	" 14	92	36	6	59	36·5
Junior Ottawa 471	" 15	93	42	6	58	43·2
Manchurian Ottawa 50	" 25	103	45	6	47	37·5
O.A.C. No. 21	" 25	103	51	5	48	39·9
Stella Ottawa 58	" 19	97	50	5	48	42·2
Success	" 6	84	40	6	46	34·9
Trebi	" 15	93	37	5	46	51·3
574 B	" 15	93	38	5	59	32·8
465 C	" 15	93	35	6	59	27·1

BARLEY, THREE, FOUR AND FIVE YEAR AVERAGES

Variety	Three-year average		Four-year average		Five-year average	
	Days to mature	Yields per acre	Days to mature	Yields per acre	Days to mature	Yields per acre
		bush.		bush.		bush.
Barks	110	43·6	109	51·0	111	47·2
Bearer Ottawa 475	104	55·4	104	61·5	109	51·7
Canadian Thorpe	106	42·0	.....	.....	.....	.....
Chinese Ottawa 60	98	40·9	98	46·0	102	43·3
Duckbill Ottawa 57	106	35·6	105	40·2	110	35·8
Feeder Ottawa 561	95	34·8	96	39·1	101	36·3
Fenil Ottawa 670	95	30·1	96	31·7	.....	.....
Gold	107	32·1	106	36·8	109	36·6
Himalayan Ottawa 59	92	43·1	92	48·7	95	44·9
Junior Ottawa 471	92	45·6	92	52·1	95	48·3
Manchurian Ottawa 50	100	43·1	100	46·0	105	40·4
O.A.C. No. 21	100	47·1	100	49·4	104	46·5
Stella Ottawa 58	98	40·0	98	44·6	102	42·2
Success	92	36·9	91	42·5	94	37·9
Trebi	96	61·3	97	63·9	100	58·0

Barley is not grown extensively in central Alberta but is gaining in popularity as a cleaning crop. The good market for brewing barleys is also tending to stimulate an interest in this crop.

Manchurian and O.A.C. No. 21, two standard six-rowed varieties, are recommended for general use. These sorts are also favoured by the brewing interests. These varieties have straw of fair strength and are reasonably productive. Variety tests indicate that the O.A.C. No. 21 variety is slightly more productive than the Manchurian.

Canadian Thorpe and Duckbill are two of the best two-rowed varieties tested. They have a slightly stronger straw than the six-rowed sorts and for this reason suggest possibilities for districts where lodging is a problem.

Trebi is a very productive sort that is gaining favour as a feed barley. It is a medium early maturing sort with rather short straw. The threshed grain sample does not compare favourably with standard sorts, tending to be rather lean.

Gold is a Swedish variety that produces rather erratic yields. It is a two-rowed variety with short fine straw. It apparently owes its productivity to its free tillering habit, hence seasonal conditions which promote free tillering produce large yields. Although the straw is very fine, it appears to stand up as well, or better than most varieties.

Himalayan is a promising variety. It is a bearded, hulless, short strawed, early maturing sort. When the absence of hull is taken into consideration it will be seen that Himalayan is one of the most productive sorts under test.

MISCELLANEOUS CEREALS

Several varieties of winter wheat were carried in the test plots for a number of years. These different sorts gave very similar results in that yields and per cent winter killing were almost equal. While some good crops of winter wheat have been harvested in the southern part of the province, the writer believes that the risk in producing winter wheat in central Alberta is too great to justify seeding this crop on an extensive scale.

Variety tests with flax indicate that fairly large yields can be produced in some seasons. As a rule fall frosts do considerable injury to immature seed pods. The average damage over a number of years would approximately be 30 per cent.

Early maturing varieties of peas give excellent yields if seeded on early land. If seeded on new breaking or summer-fallow they tend to continue blooming and thus do not produce a uniformly matured sample of grain.

Late spring and early fall frosts eliminate field beans as a possible cereal crop.

Buckwheat will produce a luxuriant growth but is so susceptible to frost injury that it is of doubtful value as a crop for this district. A very slight touch of frost will denude the plant of all bloom and thus prevent seed setting.

FORAGE CROPS

The season of 1927 was one of the best years for the production of forage crops in the history of the Station. The winter of 1926-27 was favourable for all winter crops. Crops went into the winter in ideal condition, in that there was an abundance of moisture in the fall to stimulate a vigorous growth. In addition to this, an abundance of snow from November to April provided excellent protection against low winter temperatures.

The application of experience gleaned in the forage crop experiments has more than doubled the yield of hay per acre. This is borne out by yields pro-

duced under field conditions at the Station in 1927, when 88 acres of hay produced 225 tons. The season was a little too wet and cold for corn, which made a rather slow growth.

VARIETY AND STRAIN TESTS WITH ALFALFA

The different strains and varieties are grown to determine their agricultural value for central Alberta. The plots seeded in June, 1925, were seeded in duplicate one-fortieth-acre plots, without a nurse crop, on land which was treated as a summer-fallow before seeding. Those seeded in 1926 were seeded without a nurse crop in quadruplicate one-hundredth-acre plots on land which was summer-fallowed until the plots were seeded on June 26. The first cutting only is given for the 1925 seeding as the plots were ploughed up after the first cutting was taken.

ALFALFA SEEDED IN 1925

Variety	Source	First cutting, yield of hay per acre	
		tons	lbs.
Grimm 4206	Alberta Alfalfa Seed Growers Association	1	1,278
Grimm	A. B. Lyman	1	1,757
Cossack	Paramount Alfalfa Farm	1	1,733
Cossack	Disco	2	318
Siberian	Paramount Alfalfa Farm	2	1,525
Baltic	Disco	1	1,740
Turkestan	Steele Briggs Seed Company	1	1,834

ALFALFA SEEDED IN 1926

Variety	Source	First cutting, yield of hay per acre		Second cutting, yield of hay per acre		Total yield of hay per acre	
		tons	lb.	tons	lb.	tons	lb.
Grimm	Alberta Alfalfa Seed Growers Association	1	1,571	1	650	3	221
Grimm	A. B. Lyman	1	1,265	1	544	2	1,810
Baltic	Disco	1	1,510	1	182	2	1,692
Cossack	Disco	1	1,372	1	298	2	1,670
Cossack	Paramount Alfalfa Farm	1	1,680	.....	1,980	2	1,660
Medicago falcata	Paramount Alfalfa Farm	1	1,128	.....	.....	1	1,128
Variegated	Peel County, Ontario	1	1,133	1	478	2	1,611

As a result of favourable conditions for alfalfa which prevailed during the winters 1925-26 and 27, no winter killing occurred in any of the alfalfa varieties or strains.

It will be seen that there is but little difference in the productiveness of the different sorts of alfalfa grown in 1927. *Medicago falcata* grown by the Paramount Alfalfa Farm of Rife, Alberta, is the only exception. This is not a good forage variety, as it produces a relatively small amount of leaf growth and stems that become woody very quickly. It also produces a smaller amount of second growth than other sorts.

Past experience teaches that, while there is little difference in the yields per acre produced by the different sorts, in actual farm practice it is always advisable to purchase alfalfa seed that has been produced as near home as possible. The excellent results produced by Grimm Alfalfa produced by the Alberta Alfalfa Seed Growers' Association substantiates this statement.

VARIETY AND STRAIN TESTS WITH SWEET CLOVER

Six varieties of sweet clover were included in this test. They were seeded in quadruplicate one-hundredth-acre plots on June 23, 1926, on land which was fallowed the previous season. The yields produced are given in tabular form. They were all cut on July 19.

VARIETY TESTS WITH SWEET CLOVER

Variety	Source	Date of first bloom	Total yield of hay per acre	
			tons	lb.
Arctic 439	Saskatchewan Registered Seed Growers	July 10	1	1,174
Grundy	Grundy County—Illinois	" 8	1	1,516
Maccor	Manitoba Agricultural College	" 12	1	865
White Blossom	Commercial	" 19	2	585
Yellow Blossom	Commercial	" 5	1	1,575
Zouave 778	University of Saskatchewan	" 9	1	1,431

No winter-killing occurred among the sweet clover during the past winter.

The date of first bloom indicates the relative earliness of the different sorts, but in 1927 differences were less than usual. The Arctic variety, because of proven hardiness during more trying winters, is recommended for general use in central Alberta. The strains of Arctic tested at the Station show considerable variation between individual plants of the same strain. The variety itself is not as productive of succulent forage as commercial White Blossom, as the stems are coarser with less leaf growth. Arctic is recommended purely on its ability to withstand adverse climatic conditions. Because of its habit of growth, it should not be seeded too thinly. When seeded at the rate of fifteen to twenty pounds per acre, the hay produced is finer and compares favourably with that produced by other sorts.

Zouave 778 is a yellow flowered sort of medium maturity.

Grundy and Yellow Blossom as indicated by the date of first bloom are early maturing sorts. These two varieties produce an abundance of fine stems and leaves. While they are not so productive as the Common White Blossom they would have the advantage where quality of forage is of more importance than tonnage produced.

VARIETY AND STRAIN TESTS WITH RED CLOVER

Ten varieties and strains of red clover were seeded in quadruplicate plots on June 23, 1926. As a result of a favourable winter very little winter killing occurred The yields of hay produced from the different cuttings are presented in tabular form.

VARIETY TESTS WITH RED CLOVER

Variety	Source	First cutting yield of hay per acre		Second cutting yield of hay per acre		Average yield of hay per acre	
		tons	lb.	tons	lb.	tons	lb.
Alta Swede	University of Alberta	2	1,505	.....		2	1,505
Early Swedish	General Swedish Seed Co	1	904	0	1,482	2	386
Med. Late Swedish	" "	3	506	0	.....	3	506
Late Swedish	" "	2	1,223	.....		2	1,223
Chateauguay	Quebec	1	752	0	1,740	2	492
Kenora	Kenora Dist. Co-operative	2	1,382	.....		2	1,382
Marche	North Central Italy	1	242	0	1,874	2	116
Spadone	France	1	627	0	1,989	2	615
St. Clet	Quebec	1	945	1	388	1	388
Umbria	North Central Italy	0	1,839	0	1,859	1	1,698

The single cut clovers are more productive in this district than the two cut types.

The reader should not be carried away with the idea that red clover production has no vicissitudes in central Alberta. The seasons of 1926 and 1927 are the only two years during the past seven when red clovers have not completely winter killed in the test plots as well as in the larger field.

VARIETY TESTS WITH WHITE DUTCH AND ALSIKE CLOVER

The current season was very favourable for the production of these legumes. It will be noted that the yields produced are excellent. The 1925 seedings were grown in duplicate one-fortieth-acre plots while the 1926 seedings were grown in quadruplicate one-hundredth-acre plots.

VARIETY TESTS WITH WHITE DUTCH AND ALSIKE CLOVER

Variety	Source	Yields produced from 1925 seeding		Yields produced from 1926 seeding	
		tons	lb.	tons	lb.
Alsike	Kenora Co-operative	1	1,976	1	903
Ladino (Mammoth White)	Idaho	1	846	1	479
Stryno (White Dutch)	Denmark		1,436	0	1,982
Morso (White Dutch)	Denmark			0	850
Commercial (White Dutch)	Steele-Briggs Seed Company	1	203	0	1,869

The results of this test indicate that these legumes have a place in our agriculture. The Alsike clover could be used to advantage in hay mixtures for low areas while the White Dutch has a place in our pasture mixtures. Being native to moist locations they would be more satisfactory for the foothill section and the park belt than for the open prairie. In prairie sections of Alberta where there is usually plenty of moisture for crops they should be worthy of a trial for hay and pasture.

YIELDS OF MISCELLANEOUS GRASSES

The accompanying table will give an idea of the yields produced by the different grasses grown in the variety test plots in 1927. Grasses seeded in 1925 were grown in duplicate one-fortieth-acre plots and the 1926 seedings were grown in quadruplicate one-hundredth-acre plots.

YIELDS OF MISCELLANEOUS GRASSES

Class and variety	Yield per acre, 1925 seeding		Yield per acre, 1926 seeding	
	tons	lb.	tons	lb.
Western Rye, Commercial	2	1,154	2	1,091
Western Rye, Grazer	2	707	2	1,019
Timothy, Commercial	2	1,864	2	1,542
Timothy, Boon	2	1,174	2	1,047
Timothy, Ohio 3939			2	1,097
Brome, Awnless	2	1,311	2	1,183
Kentucky Blue Grass	2	1,031	1	204

It will be seen that the grasses produced unusually high yields in 1927 as a result of favourable growing conditions. The excellent yields produced by Blue Grass are somewhat surprising as it is usually considered that this grass will not produce hay in economical quantities.

STRAIN TESTS WITH WESTERN RYE GRASS

Eleven strains of Western Rye Grass were seeded in 1926 in quadruplicate one-hundredth-acre plots. These different strains were developed at the Central Experimental Farm, Ottawa, Ont. The yields produced are presented in the accompanying table.

YIELDS OF WESTERN RYE GRASS STRAINS

Variety	Yield of hay per acre	
	tons	lb.
Western Rye No. 8	2	1,460
Western Rye No. 13	2	1,253
Western Rye No. 15	2	982
Western Rye No. 25	2	724
Western Rye No. 56	2	598
Western Rye No. 77	2	1,539
Western Rye No. 97A	2	971
Western Rye No. 100	2	1,253
Western Rye No. 116	1	1,595
Western Rye Commercial	2	1,091
Western Rye Grazer	2	1,019

Under the favourable conditions of 1926-27 there was very little difference in the yields of the different strains. A few of the strains appeared quite distinct in habit of growth, and some improved strains may be developed from this experiment.

VARIETY AND STRAIN TESTS WITH CORN

Twenty-two varieties of corn were seeded in quadruplicate plots on May 20 and were harvested on September 19. Yields and other data collected are presented in the accompanying table.

VARIETY TESTS WITH CORN

Variety	Source	Date of tasseling	Date of silking	Maturity at harvest	Green weight		Dry weight	
					tons	lb.	tons	lb.
North Western Dent	Brandon	Aug. 5	Aug. 12	Kernels watery	12	1,740	2	247
Longfellow	Disco	" 28	None	No cobs appearing	18	920	2	72
North Western Dent	"	" 26	.....	A few plants showing silk	15	264	1	1,901
90 Day White Dent	"	" 28	.....	No silk appearing	15	1,460	1	1,596
Comptons Early	J. O. Duke	" 20	.....	"	18	244	1	1,682
Golden Glow	"	" 27	.....	A few plants showing silk	12	700	1	301
Leaming	"	" 27	.....	"	10	514	1	603
Longfellow	"	" 28	.....	"	19	480	2	210
Wisconsin No. 7	"	.....	.....	No tasseling	13	....	1	254
Canadian Yellow Flint.	Duprey & Ferguson.	Aug. 11	Aug. 18	Kernels watery	17	1,880	1	1,294
Twitchells Pride	Experimental Farm, Fredricton.	" 8	" 15	"	17	406	2	266
Howes Alberta Flint	Ottawa	July 25	" 6	Medium dough	6	220	1	196
Gehu N. D. grown	McKenzies	Aug. 7	" 14	Watery kernels	18	10	2	697
North Western Dent (Crookston).	"	" 11	" 18	"	14	1,920	1	1,812
North Western Dent S. D. grown.	"	" 29	.....	No silk	14	1,900	1	1,534
North Western Red	Rennie	" 26	Sept. 6	Silk appearing	14	1,224	2	1,108
Quebec No. 28	Dr. Todd	" 13	Aug. 22	Watery kernels	14	1,900	1	1,940
Cold Resistent	U. of Wisconsin.	" 27	.....	No silk	15	160	1	1,622
Golden Glow	"	" 26	.....	"	14	1,250	2	945
Falconer	O. Will	" 9	Aug. 14	Watery kernels	15	1,720	1	1,933
Hybrid	A. Wimple	" 26	.....	No silk	15	706	1	1,958
Yellow Dent	"	" 27	Sept. 6	Silk appearing	14	1,150	2	98

The varieties grown for ensilage purposes by the Station are recommended for this purpose in Central Alberta. These varieties are Gehu and North Western Dent. Other varieties which because of their maturity suggest possibilities for the district are Canadian Yellow Flint, Twitchell's Pride, and Falconer.

Howe's Alberta Flint corn is the earliest maturing variety under test. It produces excellent ears but the amount of stalk produced is not sufficient to warrant growing this sort of fodder.

It will be seen that fully fifty per cent of the varieties are too late maturing to warrant growing them for fodder or silage.

VARIETY TESTS WITH SUNFLOWERS

Only three varieties of sunflowers were grown in the variety tests last season. They were seeded on May 20 in quadruplicate plots, and cut on September 19. Yields and other data are presented in the accompanying table.

YIELDS IN 1927

Variety	Source	Green weight		Dry weight	
		tons	lb.	tons	lb.
Ottawa No. 76	Central Experimental Farm	19	610	2	1,845
Mammoth Russian	McKenzie	27	1,120	3	300
Mennonite	Rosthern	11	1,680	1	1,886

The three varieties varied in maturity when harvested. The Mennonite was in the medium dough stage, the Mammoth Russian was five per cent in bloom and the Ottawa No. 76 was just starting to fill. The Mammoth Russian type sunflower is the best to grow for silage.

VARIETY TESTS WITH MANGELS

Twenty-nine varieties of mangels were grown in quadruplicate plots in 1927. They were seeded on May 20 and were harvested on September 26.

The mangel varieties all produced a fair yield. Mangels of the intermediate tankard and globe types are recommended over the long type. The long type varieties are heavy yielders but are so difficult to harvest that the writer believes they should take second place to the intermediate, tankard and globe types.

VARIETY TESTS WITH SUGAR BEETS

Variety	Per cent sugar in juice	Yield per acre green weight	
	tons	tons	lb.
Dippe	16·10	9	174
Home grown	14·94	8	1,615
Homing	14·35	9	564
Schreiber & Sons	15·13	8	614

The yields produced by the different varieties of sugar beets together with the relatively low percentage of sugar in the juice indicate that conditions in central Alberta are not entirely favourable for the production of this crop. Sugar beet specialists report that our frost free season is too short to permit the beets attaining the degree of maturity necessary for high sugar content. It is possible that more favourable results would be obtained on the lighter types of soil found in the district.

HORTICULTURE

The work of this Division consists of variety and strain tests of different classes of vegetables, bush fruits, tree fruits, annual and perennial flowers, trees and shrubs. The care and management of the grounds also comes under this department.

The season of 1927 was most favourable for the growth of all horticultural crops. There was an abundance of soil moisture in the spring and all crops got away to a good start. All seedlings were sturdy, and all transplanted plants made vigorous development. Very little damage was done by cutworms. A severe hail storm on July 19 did irretrievable damage. Recovery in many cases was remarkable but fleshy and tender leaved vegetables, and numerous annual and perennial flowers were damaged so badly that they were unable to recover. Bush fruits, and raspberries in particular, were an exceptionally good crop, but the hail severely injured the currants and gooseberries. Sufficient flowers and shrubs recovered from the hail damage to make the grounds of the station one of the show places of the province.

VEGETABLES

VARIETY AND STRAIN TESTS WITH ASPARAGUS

Five varieties, Palmetto, Eclipse, Giant French, Perfection and Washington are included in this test. The Giant French has produced some very large tips, although there is little difference in the different sorts.

VARIETY AND STRAIN TESTS WITH BEANS

Fifteen varieties and strains were tested. The seed was sown on May 23 in rows 30 inches apart. The earliest varieties were ready to pick on August 22. The crop was badly hailed hence yields are not comparable.

VARIETY AND STRAIN TESTS WITH CELERY

Variety	Source	Weight from 15 foot row		Remarks
		lb.	oz.	
French Success	Harris	95	0	Very heavy cropper, weight of one head. 6½ pounds.
Emperor	Scheil	85	0	Inclined to rot in the centre.
Smooth Prague	S. & B.	80	0	Very smooth variety, large heads.
White Gem	Sutton	76	8	Good variety, fine large white heads.
Giant White	Wright	75	0	Long heads, does not bleach so well.
Major Clark	Veitch	75	0	Pink variety, fine flavour, very crisp.
Paris Golden Yellow	S. & B.	74	0	Bleaches well, light yellow colour, crisp.
Superb Pink	Sutton	71	0	Very crisp, pink variety.
G. S. B.	Ottawa 3410	70	0	Good variety, crisp.
Golden Plume	Garrahan	69	0	One of the best, short thick heads.
Giant Pascal	Graham	68	0	Fine heads, does not bleach very well.
Easy Blanching	S. S.	63	0	Good blanching variety, short thick heads.
Fordhook	Burpee	62	0	Hearts low down, slow maturing.
Golden Plume	Graham	60	4	One of the best, short thick heads.
Golden Self Blanching	McDonald	58	0	Fine variety, crisp, easy bleaching.
Paris Golden Yellow	D. & F.	58	0	Bleaches well, bright yellow colour, crisp.
White Plume	Graham	56	0	One of the best blanching, very white.
Golden Paris	D. & F.	41	8	Fine variety, crisp, easy bleaching.

The celery made an excellent growth, producing high yields and good quality, one head weighing as much as 6½ pounds. The self-blanching types are best for the average gardener. French Success, Golden Plume, Easy Blanching and Paris Golden Yellow belong to this class. Experience has taught that celery can be bleached with earth more satisfactorily than by any other method. The earth should be banked up around the plants gradually during dry weather, as damp soil and banking up when plants are wet will cause the hearts to rot.

VARIETY AND STRAIN TESTS WITH CORN

Sixteen varieties were grown in test rows. They were seeded on May 30 and the first picking was ready on September 7.

VARIETY AND STRAIN TESTS WITH CORN

Variety	Source	Weight on 6 hills		Remarks
		lb.	oz.	
Paramount	Lacombe	20	0	Corn white, very early, good variety.
Banting	Strain 1926	19	0	Early fine variety, ear yellow.
60-Day Make Good	Childs	18	0	Sweet, very large ears.
Pickaninny	Ottawa 6579	17	0	Ears rather small, black kernels.
60-Day Golden	Child	16	0	Good variety, large ears.
Malcolm	Ottawa 8988 9006	14	0	Very sweet, good shape.
Howes Alberta Flint	Lacombe	11	0	Yellow ears, early variety.
Sweet Corn	Lacombe	12	0	Sweet, small ears.
Imported Early Decota	Will	8	0	Tender, good flavour.
Golden Bantam	Moore	6	0	Sweet, fair variety.
Sunshine	Will	5	0	New variety, good.
Golden Bantam	Rennie			Did not mature.
Early Mayflower	McDonald			Did not mature.
Assinaboine	Will			Did not mature.
Early June	Will			Did not mature.
Early Fordhook	Burpee			Did not mature.

The corn yields were very satisfactory when the damage done by hail is taken into consideration. The 1927 results indicate that nothing but the earliest maturing sorts should be grown for table use, as the early fall frosts take all late maturing sorts before they have developed ears sufficiently matured for table use.

VARIETY AND STRAIN TESTS WITH LETTUCE

Nineteen varieties of lettuce were sown as early in the spring as the land was fit. Three different seedings were made. The last seeding made in July produced lettuce which was fit for use in November. The first seeding was made in the hotbed and the second in May.

VARIETY AND STRAIN TESTS WITH LETTUCE

Var ety	Source	Weight of 10 selected heads		Remarks
		lb.	oz.	
Trianon	Vaughan	11	0	Cos lettuce, good flavour, crisp.
Paris White	Graham	10	10	Cos lettuce, good flavour, crisp.
Iceberg	Ewing	10	0	Cabbage, does not bolt, crisp.
Crisp as Ice	Vaughan	9	8	Cabbage, good flavour, crisp
All Seasons	Vaughan	9	0	Inclined to bolt, not crisp.
Black Seeded Simpson	Ewing	8	10	Cabbage, airly good quality.
Big Boston	McKenzie	8	8	Cabbage, does not bolt, very good variety.
Black Seeded Simpson	Dreer	8	0	Cabbage, fairly good quality.
Salamander	McDonald	7	8	Cabbage, good variety, does not bolt.
New York	McKenzie	7	6	Inclined to bolt.
Black Seeded Simpson	Vaughan	7	0	Cabbage, fairly good variety.
Extra Curled Simpson	Harris	6	10	Curly leaf, good for garnishing.
Early Curled Simpson	Dreer	6	8	Curly leaf, good for garnishing.
Imported Hanson	D & F	6	0	Loose leaf, crisp.
Early Paris Market	Ottawa 8414	6	0	Bolts early.
Wonderful	Webb	5	1	Rather coarse.
Tom Thumb	Sutton	4	0	One of the best cabbage, very crisp. fine flavour.
Black Seeded Simpson	Harris	6	3	Cabbage, fairly good variety.
Grand Rapids	Ottawa 8287	5	8	Loose leaf, the best for garnishing.

HERBS

Sage, Marjoram, Summer Savory, Thyme and Mint were sown in April in the hotbeds, were transplanted to the open in June and were harvested in September. The quantity and quality were very satisfactory.

VARIETY AND STRAIN TESTS WITH KOHL RABI

Two varieties of this vegetable were grown. There does not seem to be much demand for this vegetable by the public.

VARIETY AND STRAIN TESTS WITH PARSLEY

Three varieties of parsley were grown and all produced an abundant growth.

VARIETY AND STRAIN TESTS WITH PARSNIPS

Two strains of Hollow Crown were grown and produced excellent yields.

VARIETY AND STRAIN TESTS WITH PEAS

Twenty-six varieties of peas were included in this experiment. They were seeded on April 27 and the earliest maturing sorts were ready to use by August 1, 1927. All suffered considerably from hail damage. The earliest maturing sorts did not make as good recovery as the later sorts.

Stratagem, American Wonder, Gradus and Thomas Laxton are good varieties and are recommended for general use as they are available in the seed trade.

VARIETY AND STRAIN TESTS WITH POTATOES

The potato yields produced in 1927 were average for the district. The 1927 yield and the average yield for the past five years are given in tabular form.

VARIETY AND STRAIN TESTS WITH POTATOES

Variety	Per cent marketable	Total yield per acre, 1927		Average yield per acre for period of 5 years
		bush.	lb.	bush.
American Wonder	27	474	30	440
Ashleaf Kidney	9	426	40	435
Bliss Triumph	24	452	50	.....
Carman No. 3	12	203	40	.....
Carter Early Favourite	32	387	50	387
Country Gentleman	11½	472	20	456
Early Bovee	20	496	10	439
Early Hebron	13	459	20	429
Early Norther	14½	535	10	474
Early Ohio	36⅔	314	..	277
Early Vermont	23½	450	40	400
Empire State	23⅓	500	30	457
Everett	14	487	30	447
Extra Early Eureka	25	452	50	381
Green Mountain	16	496	10	410
Gold Coin	9	424	40	418
Gold Nugget	25	433	20	401
Houlton Rose	17⅔	465	40	457
Irish Cobbler	28	409	40	368
Lady Llewelyn	40	338	..	.....
Netted Gem	21¼	448	30	390
Rural Russet	8	348	50	.....
Six Weeks	33	528	40	435
Table Talk	30	457	10	365
Wee McGregor	24½	520	..	422

The five-year average indicates that there are several varieties which have produced very similar yields. The heaviest yielding sorts are not always the best to grow, as many of them are not suited for the potato trade.

The Gold Coin is an oval flat type. It has a white skin, is a good cooker, is acceptable to the trade and produces heavy yields of uniform tubers.

The Early Ohio is the earliest maturing sort grown by the Station. It is recommended for early market and table use.

The Netted Gem and Rural Russet sorts are two of the most popular varieties in the potato trade. They are a little too late maturing to be safe varieties for the main crop in central Alberta but should be satisfactory in the southern part of the province.

Bliss Triumph is a round, pink variety that matures in about the same number of days as the Irish Cobbler. It is an excellent eating potato. It is grown extensively in districts of the United States. There appears to be a possibility of developing a market for Alberta grown seed of this variety for export to the United States.

VARIETY AND STRAIN TESTS WITH RADISHES

Twelve varieties of radishes were included in this experiment. The three best varieties are XXX Scarlet Oval (Rennie), French Breakfast (Graham), Extra Early French White Tip (Graham).

VARIETY AND STRAIN TESTS WITH SPINACH

Nine varieties of spinach were under test. The Victoria is an excellent early maturing variety, while the New Zealand is the best late maturing sort, remaining until freeze-up without running to seed.

VARIETY AND STRAIN TESTS WITH SQUASH

Seven varieties of squash were sown in the open on June 1. The yields produced are given in the accompanying table.

VARIETY AND STRAIN TESTS WITH SQUASH

Variety	Source	Weight from one hill 3 plants	
		lb.	oz.
Large White	Sutton	181	8
Perfection	Sutton	145	8
Table Dainty	Sutton	123	8
Long Green	S. & B.	75	0
Vegetable Marrow Bush	Sutton	67	0
White Bush	S. & B.	62	8
Long White Bush	Ewing	53	8

VARIETY AND STRAIN TESTS WITH TOMATOES

Some thirty varieties were grown in 1927. Approximately fourteen hundred plants were set out. The vines were seriously damaged by hail and did not recover sufficiently to ripen fruit. Although a quantity of green fruit was produced, no yields were recorded. Previous experiments indicate that Alacrity, Bonny Best, and Earliana are good varieties. These are available in the seed trade.

VARIETY AND STRAIN TESTS WITH TURNIPS

Four varieties of early turnips were seeded. There appeared to be little choice in the varieties, although the Golden Ball appeared to retain its quality longer than the other sorts tested.

BUSH FRUITS

The hail storm of July 19 did considerable damage to the bush fruits. Strawberries were just ripening but the ripening fruit was cut off the vines by the hail stones. The green immature black, red and white currants were also stripped from the bushes. The raspberries appeared to resist the hail storm better than any of the other bush fruits. The yields produced are given in the accompanying table.

VARIETY AND STRAIN TESTS WITH RASPBERRIES

Variety	Weight from 30-foot row	
	lb.	oz.
Chegwin	77	15
Herbert	55	0
Early King	39	0
Cuthbert	31	0
Sarah	29	6
Sunbeam	23	11
Schaffer Colossal	10	10
St. Regis	7	15
New Brighton	2	11

The three best varieties are Herbert, Cuthbert, and Early King. Sarah is a late maturing variety. Chegwin is a heavy cropper but fruit falls badly with the wind. The Schaffer Colossal is a bluish or dark coloured variety.

The best varieties of other bush fruits are as follows:—

Strawberries—Senator Dunlap; Stevens Late; August Luther and Kellogg Delicious.

Black Currants—Kerry, Eagle, Climax, Ogden, Black Naples.

Red Currants—Pomona, Raby Castle, Red Grape.

White Currant—White Grape.

Gooseberries—Houghton, Carrie, Silvia.

FLOWERS

A large number of different kinds of flowers have been grown at the Station. The most suitable have been divided into different groups for the convenience of the reader.

The self seeding annuals should be seeded in the spring in the open. They will mature seed and reseed themselves each year if allowed. In fact, some of them seed so freely that there is a possibility of them becoming weeds if allowed to get out of control.

SELF SOWING ANNUALS

Variety	Remarks
Bartonia	Easily grown, free flowering, yellow.
Calendula	or Pot Marigold, colours yellow and orange.
Candytuft	White pink, and lilac, very hardy.
Linaria	Like a miniature Snap-dragon, many colours.
Corn Flower	or Bachelor Buttons, very hardy, many colours.
Pansy	Very early and late flowering.
Poppy	Mostly shades of pink.
Eschscholtzia	California Poppy, colours pink, buff, yellow, scarlet.

MOST SATISFACTORY ANNUALS AT LACOMBE

Twenty-two of the most satisfactory annuals for use in central Alberta, or districts with climatic conditions similar to central Alberta, are given in tabular form. The name, where and when to sow and remarks are also included in the table. A judicious selection from this list will provide continuous bloom from early in the spring until late in the fall.

SOME OF THE BEST ANNUALS FOR PRAIRIE PROVINCES

Botanical name	Common name	Where to sow	Date seeded	Remarks
Alyssum		Hot bed	April	Very hardy, continuous bloomer, mostly white, used for edging.
Antirrhinum	Snapdragon	Greenhouse or hot bed.	February or March.	Lovely shades of colour, will stand several degrees of frost.
Asters		Cold frame	April or May	Late blooming, one of the best decorative plants.
Chrysanthemum		Open ground	April or May	Flowering later in the season, many beautiful colours of daisies.
Dianthus	Pink	Greenhouse or hot bed.	March or April.	Continuous bloomer, very fragrant, some almost as large as carnations.
Dimorphotheca	South African Daisy	Cold frame	May	One of the first and last to bloom, good for edging, hardy.
Eschscholtzia	California poppy	Open ground	April or May	Very hardy, free flowering, many different colours.
Helichrysum	Everlasting Flower	Hot bed	April	Used for winter decorations when dried, hang upside down to dry
Larkspur		Open ground	April or May	Has more variety of colours than perennial Larkspurs, very decorative.
Linaria	Miniature Snapdragon.	Open ground	April or May	A small, delicate flower, many delicate shades, like a miniature snapdragon.
Marigold		Cold frame	End of May	Greatly improved last few years, yellows, bronze, and brown colours.
Mignonette		Open ground	April or May	Very fragrant, nice for bouquets.
Nicotiana	Tobacco plant	Hot bed	April or May	Sweet smelling, good for background.
Pansy		Greenhouse or Hot bed	March or April	Very hardy, good for edging, continuous bloomer from spring until fall.
Petunia		Hot bed	March or April.	Requires sunny situation, very free flowering, double and single.
Phlox		Hot bed or greenhouse.	May or April	A beautiful combination of colours, blooms from early summer until fall.
Poppy		Open ground	March or April	A gorgeous display in flower garden, hard to transplant, double and single.
Schizanthus	Butterfly Flower	Greenhouse or hot bed.	March or April.	Reminds one of a miniature orchid, fine for exhibition.
Stocks		Cold frame	May early	Beautiful perfume, diversity of colour, long duration of bloom.
Tagetes		Cold frame	Late May	Rather delicate, profuse bloomer very fine edging plant.
Virginia Stock		Open ground	April or May	Hardy, many light colours, free flowering.
Zinnia		Hot bed	April	Reds, scarlet and crimson make a gorgeous display, rather delicate.

HARDY PERENNIALS FOR CENTRAL ALBERTA

Thirty perennials which have given satisfactory results at this Station are arrayed in tabular form. The botanical and common name, method of propagating and time of flowering are also given. A suitable selection from this group will provide continuous bloom from early in the spring until late in the fall.

HARDY PERENNIALS FOR CENTRAL ALBERTA

Botanical names	Common name	Propagating	Time of blooming
Aquilegia in variety	Columbine	Seed in spring	Early summer tests, several weeks.
Aconitum Napellus bicolor	Monkshood	Seed in spring or division	Late summer until freeze-up
Campanula latifolia macrantha	Bellflower	Seed in spring or fall	Midsummer.
Centaurea montana	Knapweed	Seed in spring	Early summer.
Delphinium in variety	Larkspur	Seed in spring or fall by division.	Blooms for long period midsummer.
Doronicum magnificum	Leopards Bane	Seed or division	One of the first to bloom in spring.
Dianthus deltoides	Maiden Pink	Seed in spring or fall by division.	Early summer, remains a long time in bloom.
Dicentra spectabilis	Bleeding heart	Division	Early summer, does not remain long in bloom.
Chrysanthemum coccineum	Pyrethrum	Seed in spring or division	Early summer.
Dictamnus fraxinella	Gas Plant	Division	Midsummer.
Eryngium alpinum	Sea Holly	Seed in spring or fall	Midsummer, remains a long time in bloom.
Gaillardia grandiflora	Blanket Flower	Seed in spring or fall	Long period, midsummer until fall.
Gypsophila paniculata	Baby's Breath	Seed in spring	Summer until fall.
Helianthus multiflora	Sunflower	Seed in spring	Late summer.
Helenium hoopesi	Sneezewort	Seed in spring or fall	Early summer.
Hemerocallis middendorfii	Day Lily	Seed or division	Long period, early summer.
Iris in variety	Flag	Division in fall	Early summer, short period.
Lilium tigrinum	Tiger Lily	Bulblets	Late summer, long period until freeze-up.
Lychnis chalcedonica	Jerusalem Cross	Seed in spring or fall division.	Midsummer.
Paeonia	Paeony	Division early fall	Early summer, short period.
Papaver orientale	Oriental Poppy	Seed in spring	Midsummer.
Platycodon grandiflorum	Chinese Bell Flower.	Seed in spring	Midsummer, long period.
Polemonium caeruleum	Jacob's Ladder	Seed in spring or fall	Early summer.
Papaver nudicaule	Iceland Poppy	Seed in spring or fall	Early summer until freeze-up
Phlox paniculata	Phlox	Seed in spring or division	Late summer, remains long time in bloom.
Hesperis matronalis	Sweet Rocket	Division in fall	Midsummer.
Spiraea astilboides		Division in fall	Late summer.
Rudbeckia laciniata flore pleno	Golden Glow	Seed or division	Late summer until freeze-up.
Thalictrum adiantifolium	Meadow Rue	Seed in spring or division.	Early summer, log period.
Veronica spicata	Speedwell	Seed in spring or fall by division	Late summer until freeze-up.

ROSES

A large number of different roses have been grown at the Experimental Station during the last few years. The variety name, type and remarks on colour of bloom, etc., are given in tabular form. It will be noted that the varieties are divided into four groups according to hardiness. Those grouped under the first degree of hardiness do not require covering during the winter; those of the second degree of hardiness would come through some winters without protection and may become quite hardy when they become acclimatized; those of the third degree of hardiness are less hardy than the foregoing group and include those of hardiness similar to the Hybrid Perpetuals. These roses if protected during the winter will prove quite satisfactory. The last group of the fourth degree of hardiness include most of the Hybrid Tea roses. These roses will sometimes winter kill when well protected.

Experience has taught that the best winter protection for roses in Central Alberta is to bury the bush in a trench. The branches are gathered together, bent over and held in place by a wooden trough which holds the bush in place and prevents it from coming directly in contact with the soil. The soil removed from the trench is used to cover the trough and the bush. When covered in this way, the bushes are enclosed in an air space and do not come in direct contact with the soil, and as a result, do not develop mildew as much as when protected in the usual way.

ROSES GROWN AT THE EXPERIMENTAL STATION, LACOMBE

Variety	Type or species	Remarks
First degree of hardiness—		
Rosa Rugosa	Rugosa	Semi-double, crimson.
Rosa spinosissima	Briar	Grows to a height of 6 feet, makes a good hedge or pillar rose, single, cream and yellow.
Rosa rubrifolia	Rugosa	Named after its red foliage, small single flower, light centre.
Rosa Blanc de Coubert	Rugosa	Double white, not very free blooming.
Rosa Hansa	Rugosa	Double crimson, fine Rugosa rose.
Second degree of hardiness—		
Persian Yellow	Austrian hybrid Briar	Single, deep golden yellow, fine.
Harrison Yellow	Briar	Semi-double, bright, clear golden yellow.
F. J. Grootendorst	Everblooming hybrid Rugosa.	Introduced by Grootendorst, Dutch nurseryman, especially for Canada, colour bright red.
Pink Grootendorst	Everblooming hybrid Rugosa.	Pink Sport from F. J. Grootendorst, edges beautifully fringed.
Austrian Copper	Austrian Briar	Very beautiful, single, bright reddish copper.
Third degree of hardiness—		
Hugh Dickson	Hybrid Perpetual	Free bloomer, intense, brilliant crimson, wintered several years.
Mme. Edouard Herriot	Hybrid Austrian Briar	Known as the Daily Mail rose, beautiful colour, coral red, shaded with yellow and scarlet.
Gruss an Teplitz	Hybrid Tea	Free bloomer, wintered several years, dark brilliant scarlet.
Orleans	Dwarf Polyantha	Dwarf rambler, red suffused rose, white centre.
Mme. Norbert Levasseur	Dwarf Polyantha	Baby Rambler, free bloomer, crimson, wintered several years.
Catherine Zeimet	Dwarf Polyantha	White Baby Rambler, profuse bloomer.
Tausendschon	Rugosa	Dwarf Rambler, light pink changing to carmine.
General Jacqueminot	Hybrid Perpetual	Good shape, dark red colour.
John Hopper	Hybrid Perpetual	Bright rose, centre carmine.
Frau Karl Druschki	Hybrid Perpetual	Pure snow white, one of the best white roses, vigorous.
Mme. Caroline Testout	Hybrid Tea	Pink, free flowering, large bud.
Captain Hayward	Hybrid Perpetual	Brilliant crimson carmine.
Mrs. John Laing	Hybrid Perpetual	Soft rosy pink, very fine.
Alfred Colomb	Hybrid Perpetual	Bright light crimson, vigorous grower.
American Pillar	Rugosa	Single, rich rosy pink, light centre, vigorous grower.
Captain Christy	Hybrid Perpetual	Delicate flesh colour, rosy centre.
Ulrich Brunner	Hybrid Perpetual	Cherry red, large flower, free blooming, very popular.
Fourth degree of hardiness—		
Admiral Ward	Hybrid Tea	Crimson, shaded fiery red.
Dorothy Perkins	Wichuraiana	White Dorothy Perkins, climbing rose.
American Beauty	Hybrid Perpetual	Dark rose carmine, large, grown largely by florists.
Covent Garden	Hybrid Tea	Large flowers, deep red crimson, fine shape.
Etoile de France	Hybird Tea	Velvety dark red, fine in the bud.
Fisher Holmes	Hybrid Perpetual	Very dark scarlet, large fine flower.
Gorgeous	Hybrid Tea	Strong grower, large orange with coppery shades.
Mme. Butterfly	Hybrid Tea	Very fine foliage, harmony of pink, apricot and gold.
Mme. Abel Chatenay	Hybrid Tea	Salmon pink, free bloomer.
Mme. Ravary	Hybrid Tea	Yellow buds, continuous bloomer, opening orange, very fine.

POULTRY

White Wyandottes only are now raised at this Station. On December 31, 1927, the flock consisted of three hundred and ninety-five birds. In addition to these there were also two pens of twelve birds each entered in the Egg Laying Contests at Lethbridge, Alberta, and Indian Head, Saskatchewan.

BREEDING

The objects sought for in breeding operations have been high egg production, combined with good breed type, fertility, hatchability, and large eggs. Increase in size of egg is a very important factor in Wyandottes and is being very care-

fully sought for in our breeding operations. All birds are trap-nested throughout the year and only the heaviest producing hens of good type and laying eggs weighing at least 24 ounces to the dozen are retained as breeders. By mating these with carefully selected males, from hens which had produced large sized eggs, a marked improvement has been noted from year to year in the average size of eggs of the entire flock. Unfortunately a number of our highest producers have to be culled out because of small eggs resulting in a reduction in the egg production per bird. The average production of the flock for the year November 1, 1926, to October 31, 1927, was 185 eggs per bird. This was 4 eggs below that of the previous laying year but the highest individual production was 268 eggs, while the highest previous record was 261 eggs.

The demand for cockerels for breeding purposes has been far beyond the supply and during the year 126 males were sold to local poultrymen and farmers. All were from trap-nested stock. In addition to the cockerels there is always a great demand for small breeding pens of mature birds, and for hatching eggs, from farmers wishing to get a start in bred-to-lay stock.

REARING FROM CHICKS TO LAYING PULLETS

No feed is given until the chicks are about 72 hours old. At hatching time the chicks are supplied with a certain quantity of food material in the yolk sack which has been absorbed into the body just prior to hatching, and if the chicks are fed too soon after hatching bowel trouble usually results.

The first feed is a chick mash which contains a variety of grains. This is given upon clean newspaper spread on boards that are about 8 inches wide. A board 3 feet long and 8 inches wide will give room enough to feed fifty chicks on the start. One ounce at a feed to fifty chicks is sufficient mash for the first week if given at intervals of two hours during the day. Buttermilk and chick grit are before the chicks all the time, and finely ground alfalfa is fed once a day. It is a mistake to overfeed chicks at the start. They must be fed frequently at first, but only a small quantity each time.

When the chicks are two weeks old they are given access to the chick mash in hoppers and a feed of chick grain is scattered in the litter morning and evening to keep them busy.

At eight weeks of age they are put on range, usually an alfalfa field beside a sunflower field where they can get all the succulent greenfeed they can eat and still have shade as required. Their ration is changed to equal parts cracked corn and wheat in place of the commercial scratch gain, and a mixture consisting of 100 pounds bran, 100 pounds shorts, 50 pounds oat flour, 50 pounds corn meal, 50 pounds beef scrap, 10 pounds bone meal, 10 pounds grit and 3 pounds charcoal, instead of the commercial chick mash. Both grain and mash are fed in hoppers, and this manner of feeding with the above rations is carried on until the chicks are put in laying houses about November 1.

After pullets are placed in the laying houses the following ration is used:—

DRY MASH

Bran	100 pounds
Shorts	100 pounds
Corn meal	100 pounds
Oat flour	100 pounds
Beef scrap	25 pounds
Charcoal	3 per cent

A home-mixed scratch grain consisting of equal parts cracked corn and wheat is scattered in a deep litter of straw in the morning and again in the afternoon, a heavier feed being given in the afternoon than in the morning. This induces the birds to exercise.

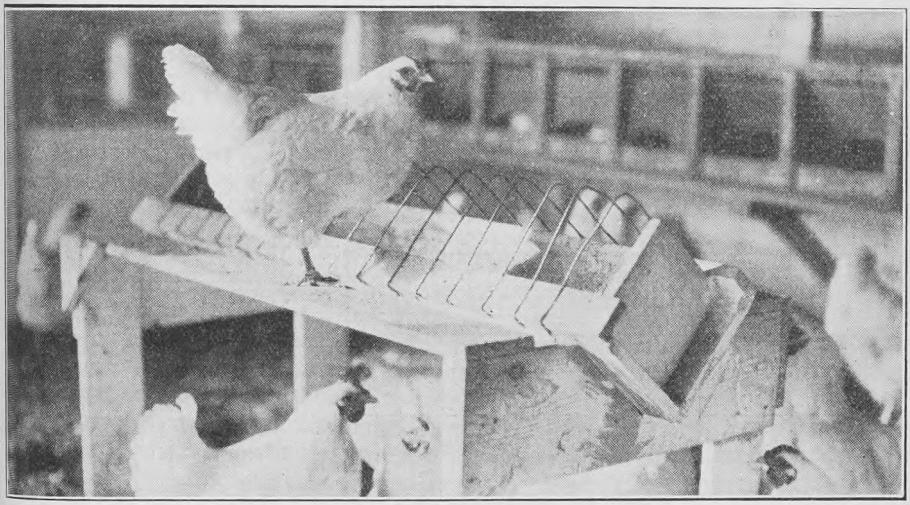
The dry mash is kept in a hopper before the pullets at all times, and plenty of fresh buttermilk and fresh water are supplied for drink. A mash, moistened with buttermilk, of the same formula as that fed dry, is fed at noon to increase the amount of mash consumed. Grit and oyster shell are available in hoppers, and green feed is supplied either by alfalfa leaves or mangels, cabbage and sprouted oats.

EGG-LAYING CONTESTS

Beginning in 1924 and continuing every year since that time, this Station has entered a pen of White Wyandotte pullets in the Alberta Egg Laying Contest at Lethbridge, Alberta. The following table gives the results obtained:—

Year	Number of birds	Number of eggs laid	Average per bird	High bird	Points
1924-1925	10	1,508	151	209	No points given
1925-1926	10	1,570	157	228	1,389·3
1926-1927	10	1,878	188	246	1,802·3

It will be noted from the above table that there has been an annual increase both in number of eggs laid and in points for size of eggs, indicating progress in our breeding operations.



Cheap but serviceable dry mash hopper. It is easily filled, there is no waste, and it provides plenty of freedom for the hens.

The following table shows only the cost of egg production and returns from eggs at market prices, and does not take into consideration the increase in the flock, the sales of cockerels, laying stock, hatching eggs, market fowl, etc.

MONTHLY STATEMENT OF EGG PRODUCTION, FEED CONSUMED, PROFIT AND LOSS ON WHITE WYANDOTTES, BRED AND RAISED AT THE DOMINION EXPERIMENTAL STATION LACOMBE, ALBERTA, FOR THE LAYING YEAR NOVEMBER 1, 1926, TO OCTOBER 31, 1927.

Month	Number of birds	Total eggs laid	Average per bird	Average price per dozen	Total market value	Feed consumed					Total cost of feed	Cost to produce 1 dozen eggs, labour neglected	Profit on 1 dozen eggs, labour neglected	Loss on 1 dozen eggs, labour neglected	Total monthly profit	Total monthly loss
						Grain	Mash	Grit	Green-feed	Butter-milk						
				cents	$	lb.	lb.	lb.	lb.	lb.	$	cents	cents	cents	$	$
1926																
November	236	2,711	11·44	50	112 95	692	592	19	620	370	34 86	15·4	34·6	.....	78 09	.....
December	235	1,730	7·44	50	72 08	800	581	17	620	370	36 79	25·5	24·5	.....	35 29	.....
1927																
January	232	1,573	6·7	35	45 88	740	599	17	620	370	35 95	27·4	7·6	.....	9 93	.....
February	226	1,199	5·30	35	34 97	570	543	24	495	305	30 34	30·4	4·6	.....	4 63	.....
March	216	1,879	8·69	20	31 32	649	724	14	620	370	36 60	23·4	.....	3·4	.....	5 28
April	211	2,046	9·69	22	37 51	625	630	21	620	355	34 29	20·1	1·9	.....	3 22	.....
May	206	2,006	9·83	20	33 43	534	385	10	400	370	25 50	15·2	4·8	.....	7 93	.....
June	198	1,586	8·01	22	29 11	430	307	12	.....	340	18 23	13·8	8·2	.....	10 88	.....
July	181	1,253	6·92	25	26 10	295	301	15	.....	340	15 43	14·8	10·2	.....	10 67	.....
August	157	1,106	7·04	25	23 04	160	221	16	.....	340	11 14	12·1	12·9	.....	11 90	.....
September	150	502	3·34	30	12 55	130	222	10	.....	340	10 52	25·1	4·9	.....	2 03	.....
October	148	205	1·31	40	6 83	105	214	6	.....	340	9 82	57·5	.....	17·5	.....	2 99
Totals	.....	17,796	.....	.....	465 77	5,730	5,319	181	3,995	4,210	299 47	.....	.....	.....	174 57	8 27

Net grain over cost of feed $166.30.

CORN VS. BARLEY

This experiment was conducted for the purpose of determining if barley is a satisfactory substitute for corn in the grain ration of laying pullets for winter egg production. This test was commenced on November 1, 1926, and continued until April 30, 1927, covering a period of six months. Twenty White Wyandotte pullets were used. They were divided equally as to size and general development into two pens of ten birds each. The grain feeds in one pen were the standard scratch and the standard mash, both containing considerable corn, while in the other pen the corn was left out of the scratch and mash and barley and barley meal substituted. The scratch feed was fed in the litter and the mash was fed dry in a hopper and was always available. Alfalfa was given as green feed and they had free access to grit and buttermilk. The results were:—

CORN VS. BARLEY IN RATION

Feed under test	Mash	Scratch grain	Grit	Green-feed	Butter-milk	Value of feed	Number of eggs laid	Feed cost per dozen
	lb.	lb.	lb.	lb.	lb.	$		cents
Corn	272	267	7½	385	175	15·01	609	29·6
Barley	261	260	10	385	175	11·58	542	25·6

From a study of the preceding table it may be noted that the pullets receiving the corn in the rations produced 67 more eggs with the consumption of only 18 pounds more feed, but on account of the high cost of the corn as compared with barley the cost per dozen of eggs produced was 4 cents in favour of the barley-fed pen. The increased egg production in the corn-fed pen was not sufficiently large to counterbalance the additional feed cost of the ration. These results would seem to indicate that it would not be necessary for the average poultryman or farmer to purchase high-priced cracked corn if he has a supply of good quality barley available. The general health of the birds in both pens was good notwithstanding a mortality of one bird in each pen. The deaths were caused by ruptured egg-organs.

COMMERCIAL VS. HOME-MIXED MASH

A home-mixed dry mash was compared with a commercial mash in this experiment. Two pens of White Wyandotte pullets were used and the home-mixed mash consisted of 100 pounds oat flour, 100 pounds shorts, 100 pounds bran, 100 pounds cornmeal, 25 pounds beef scrap, and charcoal, 3 per cent. Both pens received scratch grain consisting of equal parts of wheat and cracked corn. The hens fed commercial mash produced more eggs during the period from November 1 to April 30, than did those receiving home-mixed mash but at a cost of one cent more per dozen. In the previous year the cost per dozen eggs was 1.8 cents in favour of the commercial mash. It will be necessary to continue the experiment in order to arrive at definite conclusions.

COMMERCIAL VS. HOME-MIXED SCRATCH GRAIN

A home-mixed scratch grain composed of equal parts of wheat and cracked corn was compared with a commercial grain. Two pens of White Wyandotte pullets were used, and the experiment lasted from November 1, to April 30. All the pullets received the standard mash ration and green feed, grit and buttermilk. The pullets fed home-mixed grain produced more eggs on less feed than those

receiving commercial grain. The cost per dozen eggs was 8.7 cents in favour of the home-mixed grain. These results agree with those obtained in the previous year.

FEEDS FOR FERTILITY, HATCHABILITY AND VIABILITY

The object of this experiment is to determine the effect upon fertility, hatchability and viability when supplementary feeds such as cod liver oil, raw liver, bone meal, etc., are added to the regular ration given to breeding stock.

Five equal pens of birds used for breeding purposes were housed, handled and fed alike except for the special feeds added to the regular ration. Pen number five was considered as a check pen and received a basal ration of dry mash available in hoppers and scratch grain in the litter. The dry mash consisted of 100 pounds oat flour, 100 pounds shorts, 100 pounds bran, 100 pounds corn meal, 25 pounds beef scrap and 3 per cent charcoal and the scratch grain of equal parts wheat and cracked corn. Buttermilk was supplied to all pens daily. Grit was supplied in hoppers and finely cut alfalfa was fed as greenfeed. The other four pens were fed the same basal ration but received in addition the following:—

Pen No. 1.—One and one-half teaspoonfuls of cod liver oil per pen daily.

Pen No. 2.—Three ounces of raw liver per pen daily.

Pen No. 3.—Five per cent by weight of bone meal added to the dry mash.

Pen No. 4.—Two ounces of raw liver and one teaspoonful cod liver oil per pen daily.

All of the supplementary feeds excepting the bone meal were fed in a moist mash of the same composition as that fed in the hopper.

The experiment was divided into two periods with one week between them. For the second period the males were alternated daily from one pen to another in rotation. This would eliminate to a large extent the effect of individual males on fertility, etc. The first period covered 82 days and the second period 34 days. Separate records were kept for each of the two periods. The results are as follows:—

Effect of Supplementary Feeds on Fertility, Hatchability and Viability

	Pen 1		Pen 2		Pen 3		Pen 4		Pen 5	
	Basal ration plus 1½ teaspoons cod liver oil daily		Basal ration plus 3 ounces liver daily		Basal ration plus 5% by weight bone meal in dry mash		Basal ration plus 2 ozs. liver and 1 teaspoon cod liver oil daily		Basal ration	
	Males		Males		Males		Males		Males	
	Continuous	Changed daily	Continuous	Changed daily	Continuous	Changed daily	Continuous	Changed daily	Continuous	Changed daily
Eggs set	130	31	224	55	153	56	115	25	164	50
Number fertile	62	7	194	50	142	51	100	23	120	38
Per cent fertile	47·6	22·5	86·6	90·9	90·2	90·7	66·6	92	73·2	76
Chicks hatched	20	2	113	26	95	23	59	6	71	17
Per cent total eggs hatched	15·3	6·6	50·4	47·2	62·1	41·6	38·8	24	40·3	34
Per cent fertile eggs hatched	32·2	25·5	58·1	52	66·2	45·1	59	26·1	59·2	44·7
Chicks alive at three weeks	10	2	98	11	80	18	48	2	61	6
Total eggs required to hatch 1 chick	6·5	15·5	1·9	2·1	1·6	2·4	1·9	4·1	2·3	2·8
Fertile eggs required to hatch 1 chick	3·1	3·5	1·7	1·9	1·4	2·2	1·6	3·8	1·6	2·2
Total eggs required for 1 chick to three weeks of age	13	15·5	2·2	5	1·8	3·1	2·3	12·5	2·6	8·3

Pen 3 fed the basal ration plus 5 per cent by weight of bone meal gave the best results respecting fertility, hatchability and viability followed by the pen fed raw liver. The cod liver oil fed pen gave the poorest results of any of the feeds under test.

During the period in which the males were alternated there was an increase in the percentage of fertility in all pens except the one fed cod liver oil. It should also be noted that there was a decrease in the percentage of hatchability in all pens during the time that the male birds were changed from pen to pen daily. This, however, may be partly due to the difference in the time of the year.

HATCHING RESULTS FROM HENS AND PULLETS

Hatching results obtained with eggs from mature hens and from pullets show very little difference as to fertility and hatchability. With regard to viability of chicks, the results were in favour of the hens, the pullets requiring 4.03 eggs for one wing-banded chick against 3.87 by the mature hens. It should be noted that 2,220 eggs from pullets were set against 1,199 from the hens.

BUTTERMILK VS. BEEF SCRAP

Two pens of White Wyandotte pullets were used in an experiment lasting from November 1 to April 30, with the object of comparing buttermilk with beef scrap as a source of animal protein for winter egg production. The ration given to each pen was the same with the exception of the buttermilk and beef scrap. In this experiment the beef scrap produced slightly better results than the buttermilk from the standpoint of egg production. The cost per dozen of eggs produced was 1.6 cents per dozen in favour of the beef scrap.

COST OF REARING YOUNG CHICKS

Records were kept again this year of the eggs, fuel and feed required to hatch and rear chicks to the end of the brooder period, or approximately two months of age. No allowance, however, was made for labour, interest, and depreciation on buildings. The figures that follow cover chicks hatched and purchased as follows:

Cost of Rearing Chicks to End of Brooder Period—	
Number of eggs set	3,419
Number of chicks hatched	1,212
Number of chicks alive, July 3	861
Incubation and Brooding Periods—	
Statement of cost—	
2,516 fertile eggs at $1.50 per setting of 15	$ 251 60
903 infertile eggs at 40 cents per dozen	30 10
4,215 pounds soft coal at $8.00 per ton	16 86
483 pounds chick starter (mash) at $5.00 per cwt	24 15
2,045 pounds chick feed (grains) at $3.25 per cwt	66 46
204 pounds bran at $27.00 per ton	2 75
204 pounds shorts at $29.00 per ton	2 96
104 pounds oat flour at $2.25 per cwt	2 34
104 pounds corn meal at $2.75 per cwt	2 86
104 pounds beef scrap at $3.50 per cwt	3 64
24 pounds bone meal at $2.50 per cwt	0 60
24 pounds grit at 75 cents per cwt	0 18
8 pounds charcoal at $5.50 per cwt	0 44
7,693 pounds buttermilk at 20 cents per cwt	15 38
80 pounds finely cut alfalfa at $18.20 per ton	0 73
Total cost of 861 chicks, labour neglected	$ 421 05
Cost per chick, labour neglected	0·489

On July 3 the chicks were taken out of the brooder house and put on range. They were run on range until October 1 or approximately to five months of age. The number of chicks alive on that date and the cost of feed are shown in the following table:—

Cost of Rearing Chicks to Five Months—

Number of chicks alive July 3	861
Number of chicks alive October 1	658

STATEMENT OF COST

Cost of 861 chicks to July 3	$ 421 05
700 pounds bran at $27.00 per ton	9 45
700 pounds shorts at $29.00 per ton	10 15
350 pounds oat flour at $2.25 per cwt	7 87
350 pounds corn meal at $2.75 per cwt	9 62
350 pounds beef scrap at $3.50 per cwt	12 25
70 pounds bone meal at $2.50 per cwt	1 75
70 pounds grit at 75 cents per cwt	0 52
24 pounds charcoal at $5.50 per cwt	1 32
43 bushels wheat at $1.00 per bushel	43 00
1,290 pounds cracked corn at $54.00 per ton	34 83
7,781 pounds buttermilk at 20 cents per cwt	15 56
Total cost of 658 chicks, labour neglected	$ 567 37
Average cost per chick, labour neglected	0·862

From the summary it may be noted that the average cost per chick at the end of approximately five months was $0.862 for 1927. The average cost of 597 chicks during the same period last year was $0.882.

BEST DATE FOR INCUBATION

The records of this experiment, both in 1926 and 1927, indicate that the best hatching results are obtained from March to early May, and that it is not advisable to hatch chicks after the end of May. The mortality in June hatched chicks is very high at this Station partly for the reason that in very warm weather it is impossible to properly regulate the brooder temperatures. June hatched chicks also lack vitality and are unsatisfactory as layers. The total eggs required for one chick when wing banded was 3.2, 2.5 and 4.8 respectively in March, April and May, while in June the large total of 12.6 was required.

BEES

The weather during the season of 1927 was not wholly satisfactory from a beekeeper's standpoint. May and June were cool and showery with considerable wind, with the result that the bees were unable to gather any surplus pollen and nectar. The result was that they were slow in building up their strength for the main honey flow. Warmer weather fortunately started about the seventh of July, when they began storing honey. This fine weather continued up to the fifteenth of August, after which no further gains were made. The colony on the scale showed a daily loss from this time until they were placed in winter quarters. Although the main honey flow was not long, the colonies made a good showing, the average amount of extracted honey produced amounting to 108.6 pounds per colony. Had there been only a few colonies of bees in the apiary, such as would be the case on an ordinary farm, the honey flow would have been longer and the yields higher. The number of colonies in the station apiary at the spring count was forty-seven. Where this number of colonies is kept, pasture other than native bloom must be provided. The later honey flow at the station was produced by legume hay crops, and no further gains were made after these crops were harvested.

The highest daily gain was made on August 4 when the hive on the scale increased 12 pounds in weight. The highest yield from one colony was 210 pounds.

COMPARISON OF RACES OF BEES

This experiment was started in 1926. the colonies being located at an outapiary. In 1927 the colonies were included in the station apiary. The three races compared were Carniolan, Caucasian and Italian. The results of this experiment are summarized in the accompanying table.

Race	Number of colonies in group	Amount of honey produced	Average per colony	Number of drawn combs
		lb.	lb.	
Italians	3	372	124	60
Caucasians	3	342	114	45
Carniolans	3	285	95	45

Although the Italians were the weakest in the spring, they produced the highest yield of honey per colony. The Carniolans built up very quickly in the spring but persisted in raising queen cells during the honey flow thus materially reducing the amount of honey they might have stored. The Caucasians, although similar to the Carniolans in appearance, did not show the same tendency to build queen cells and make preparations for swarming. The Caucasians appeared to be the most active of the three races during the warmer part of the day.

Claims have been made that the Carniolans will work at lower temperatures than other races. Observations made indicate that this was not the case. On four different occasions it was noted that the Italians were flying at five o'clock in the morning while the other two races did not begin working until after seven. The Caucasians and Carniolans had stopped flying at eight o'clock in the evening while the Italians were still coming home when it was too dark to see them in the air at half-past nine. The Italians thus worked a three hour longer day than the other races.

OVER-WINTERED VS. PACKAGE BEES

The object of this experiment is to determine the relative value of over-wintered versus package bees as honey producers. Ten colonies of 3 pound package bees received on May 5, produced an average yield of 102 pounds of extracted honey per colony, while ten colonies of cellar wintered bees taken from cellar on April 12, produced an average yield of 118 pounds of extracted honey per colony.

WINTER PROTECTION

The object of this experiment is to determine what method of wintering bees is most satisfactory. In this experiment four colonies which were packed in single Kootenay cases during the winter produced an average of 133 pounds of extracted honey during the season. Of the four colonies packed in double cases, three produced an average yield of 108 pounds of extracted honey per colony and one died, sixteen were packed in quadruple wintering cases; two of this lot died and the other fourteen produced an average yield of 108 pounds extracted honey per colony. Fourteen colonies were placed in the office basement on November 8. Two of these colonies died and the twelve remaining ones produced an average yield of 120 pounds extracted honey per colony. It will thus be seen that no one method of wintering protection has material advantage over the others. The winter losses and differences in yield were apparently due to factors other than winter protection.

SUMMER PROTECTION

Nineteen colonies were included in this experiment. Two colonies in Jumbo hives protected by Kootenay cases produced an average yield of 105 pounds per colony, while four unprotected Jumbo hives produced an average of 90 pounds of honey per colony. Two colonies in ten frame Langstroth hives with only the brood chamber protected gave an average yield of 157 pounds of extracted honey per colony. Four colonies in Langstroth hives protected by Kootenay cases gave an average yield of 132 pounds of extracted honey per colony, and seven colonies in Langstroth hives without protection averaged 117 pounds extracted honey per colony. In view of this evidence it would seem as though the protection of the brood chamber at least is advisable.

PREVENTION AND DETECTION OF SWARMING BY MANAGEMENT

Results in 1927 were similar to those in 1926 in that the shallow supers used on most of the colonies to facilitate detection of swarming as indicated by the production of queen cells was quite effective. With the exception of two cases, the queen cells were found on the bottom bars of the frames of the shallow supers. In the two exceptional cases, the queen cells were found on the large frames of brood chamber and later proved to be supercedures.

When queen cells were formed the colonies were manipulated in the following manner. Some colonies had the frames containing young brood raised to a second super with a queen excluder placed between the first and the second supers, the queen being left in the brood chamber with drawn combs. In the second method of manipulation a young queen was introduced and the old queen was either destroyed, or removed with one frame of brood and adhering bees to form a nucleus on a new stand. Both these methods proved effective. If one is desirous of increases the latter method is recommended.

COMPARING KINDS OF HIVES

Comparisons were made between the standard ten-frame Langstroth and the ten-frame Jumbo hives. In 1926 the Jumbo hives gave slightly higher yields of honey. This was not the case in 1927 as colonies in the Langstroth hives gave slightly better yields. It was found that the brood chamber of the ten-frame Langstroth was hardly large enough for a prolific queen, but the addition of a half super as used for detection of swarming gave ample room and in addition was much easier to manipulate than the Jumbo. Jumbo brood chambers necessitate Jumbo supers which when filled with honey weigh at least 100 pounds. These are too heavy for the ordinary man to manipulate with ease. The Jumbo brood chamber is better for an unusually prolific queen; the average queen, however, will build up more quickly in a Langstroth brood chamber, and the half super can be added if it becomes necessary.

UNITING COLONIES FOR MAIN FLOW

In this experiment four colonies were united to form two strong colonies. The two colonies produced an average of 130.5 pounds of honey. While this is above the average produced by the whole apiary, it is believed that more honey would have been produced if the colonies had not been united. When colonies are united there is considerable loss through fighting and the tendency to swarm as soon as they have settled down. For this reason it is considered advisable not to unite colonies unless they are quite weak, or queenless.

INCREASED STRENGTH OF COLONY FOR MAIN FLOW

The object of this experiment is to increase the field force of the colony for the main honey flow. As soon as the weather becomes warm and the bees fill the brood chamber in the spring, three to four frames of capped brood with adhering bees are elevated to a super. An ordinary bottom board with the three-eighths of an inch side down is placed over the brood chamber after nailing a cleat across the front so as to rest on the front edge of the hive. Place the super containing the brood on top of this floor board and introduce a laying queen. The bees in the lower hive body use the lower entrance while those in the upper have an entrance of their own. The lower chamber containing the old queen is removed for increase at the commencement of the main honey flow, leaving the upper chamber on the old stand. The two forces of field bees are united as the workers come back to the old stand. Four colonies which received this treatment gave an average production of 148 pounds per colony as well as an increase of one colony each. It will be seen that this manipulation resulted in yields of honey above the average for the rest of the apiary.

EXTENSION AND IMPROVEMENTS

The hogs at the station have been kept on very much the same land since the herd was started in 1913. Partly as a result of this, and partly from the large number of sows annually brought in for breeding many of the pigs had become infested with worms. During the summer new pastures on brome grass sod were fenced off. Before being put on these new pastures every hog was treated twice for worms with either oil of chenopodium or santonin. The main piggery and all cabins were disinfected with hot lye. As a result the worms seem to have been almost eradicated and the health and thriftiness of the hogs is very much improved.

The somewhat flat roof on the monitor type dairy barn had been leaking for years and as this type of building had not proved satisfactory for a climate where the temperature frequently drops below zero the monitor top was removed and replaced by a good sized loft for feed and bedding straw. The ventilation in the stable is now much better.

With the increasing number of years during which land has been under cultivation in Alberta, new problems are constantly arising. There is now a demand for information concerning commercial fertilizers. Root rots are rapidly becoming a very serious menace to cereal crops. Information is urgently needed concerning the reaction of registered strains of cereals to changes of environment. These three problems would require the addition of a large number of plots to the land now under experimental work. This land is not available, particularly during these wet years when several acres formerly used are constantly under water. More land is a most urgent necessity for this station.

Three "Field Days" were held during the year, Forage Crops July 12, Cereal Crops August 18, and Beekeepers' Day August 20. About 800 people visited the station on these three days, but a much larger number of farmers saw the experimental work in the small parties which are at the station almost every day in the year. These visitors come from all parts of Alberta and there is a rapidly increasing number of visitors from the United States. While a visit to the station is much the best way to study the experiments, particularly in field crops and horticulture, thousands of questions are answered through correspondence and telephone calls. The annual report and bulletins are mailed to about 10,000 farmers.

During the year members of the staff judged live stock, poultry and field crops at a number of fairs and addressed a large number of farmers meetings.

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